

Financial systems between Traditional Finance (TradFi) and Decentralized Finance (DeFi)

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Abstract:

This study aims to clarify the concept of Decentralized Finance, this type of finance is a blockchain-based financial. So, DeFi refers to the ecosystem of decentralized financial applications (DApps) on the blockchain. This study concluded that unlike TradFi, DeFi's architecture has the potential to create an immutable and interoperable financial system with a high degree of clarity, equal access rights and a minimal need for custodians and central clearing houses, since smart contracts will perform the majority of these functions.

Keywords: DeFi, TradFi, Blockchain, Dapps, smart contracts.

JEL Classification Codes : G22. G52. O32.

Résumé:

Cette étude vise à clarifier le concept de la finance décentralisée. Ce type de finance repose sur la technologie de la blockchain. Ainsi, la DeFi désigne l'écosystème des applications financières décentralisées (DApps) fonctionnant sur la blockchain. Cette étude conclut que, contrairement à la finance traditionnelle (TradFi), l'architecture de la DeFi a le potentiel de créer un système financier immuable et interopérable, caractérisé par un haut degré de transparence, une égalité d'accès et un besoin minimal d'intermédiaires de conservation et de chambres de compensation centrales, étant donné que les contrats intelligents assurent la majorité de ces fonctions.

Mots-clés : DeFi, TradFi, Blockchain, DApps, contrats intelligents.

Codes de classification JEL : G22, G52, O32.

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I. Introduction

The open Digital innovation has brought major improvements to the financial system. Decentralized Finance (DeFi) offers an alternative to centralized finance or traditional finance by the use of public blockchain to conduct transactions without having to rely on centralized service providers such as custodians, central clearinghouses, or escrow agents. Instead, these roles are assumed by smart contracts, which are also called self-executing contracts.

DeFi protocols can be designed in a way that prohibits intervention and manipulation. All participants can observe the rules before they engage and verify that everything is executed accordingly.

In the financial industry, blockchain technology enhance the rise of decentralized financial services that have the potential to reduce transaction costs expanded financial inclusion, facilitate open access and create more new opportunities.

1. Research Problematic: Accordingly, and Based on what is mentioned above, the problem of this research has been formulated in the following main question:

How did decentralized finance revolutionize the global financial system and especially traditional finance TradFi?

The main question includes the following sub-questions:

- ✓ **What is meant by DeFi and what are its most important features?**
- ✓ **What are the different between DeFi and TradFi?**
- ✓ **What are the main requirements of DeFi applications in financial systems?**

To answer the main question and the sub-questions, the following basic hypothesis was adopted:

Unlike TradFi, DeFi protocols eliminate central authorities

2. Research objectives

This research paper aims to achieve the following points:

- Defining the main features of both DeFi and TradFi;
- Examine the advantages which can be gained from DeFi Compared to TradFi;
- Clarify the main requirements to adopt DeFi;
- Defining the main differences and challenges of DeFi;
- Highlighting the most important developments in the global decentralized finance market.

3. Research importance:

The topic is very significant, because DeFi industry is different from traditional ones, although both types of finance fulfill the same needs of adequate ecosystem, but in different ways. DeFi has gained significant importance and has the possibility to disrupt and revolutionize the traditional financial system.

4. Research methodology

To study this topic, a descriptive approach was adopted, by collecting and analyzing data and information on the subject of the study. For this purpose, many relevant references have been relied upon, in addition to the websites.

5. Research plan

This research is structured as follows: first points cover the theoretical background of DeFi, its most important elements and also gives some general overview of the key financial services, the Second points discuss the main challenges and risks of DeFi, and third points discuss the current situation of DeFi global market.

6. Literature of previous studies: Among the previous studies we can mention the following:

6.1 The study of Felix Adebayo Bakare (2024), study entitled: ***Blockchain and decentralized finance: Disrupting traditional banking and financial systems***, this paper's aim is to clarify how blockchain technology and DeFi are revolutionizing traditional banking and financial systems by eliminating the need for intermediaries, reducing transaction costs, and fostering more inclusive financial services.

Unlike centralized systems that rely on trusted third parties such as banks DeFi operates on decentralized networks powered by blockchain technology. The study reached a set of results, the most important are the rise of DeFi eliminates challenges such as technological risks.

6.2 The study of Raphael Auer & others (2023), study entitled: ***The Technology of Decentralized Finance*** (BIS Working Papers No 1066), this study provides a deep analytic to the DeFi protocols. The authors analyse and explain the individual components of a DeFi Stack Reference (DSR) model by its three layers: settlement, applications and interfaces, they discuss also the financial services for the most important DeFi categories, for example decentralized exchanges, lending protocols, derivatives protocols and aggregators.

6.3 The study of Fabian Schär (2021), study entitled: ***Decentralized Finance: On Blockchain- and Smart Contract-based Financial Markets***, this article highlights opportunities and potential risks of the DeFi ecosystem. The researcher proposes a multi-layered framework to analyze the implicit architecture and the various DeFi building blocks, including token standards, decentralized exchanges, decentralized debt markets, blockchain derivatives, and on-chain asset management protocols. The study concluded a set of results, the most important are: the DeFi still an emerging market with certain risks but that it also has interesting properties in terms of efficiency, transparency, accessibility, and composability.

6.4 The study of Dirk A. Zetsche & others (2020), study entitled: **Decentralized Finance**, this article clarify how DeFi has joined FinTech, RegTech, cryptocurrencies, and digital assets as one of the most discussed emerging technological evolutions in global finance. The study concluded a set of results, the most important are: the decentralization has the potential erode the effectiveness of traditional financial regulation. At the same time, they find that where parts of the financial services value chain are decentralized, there will be a reconcentration in a different part of the value chain. DeFi potentially offers an opportunity for the development of an entirely new way to design regulation, the idea of "embedded regulation".

II.1 Decentralized Finance (DeFi): Theoretical background

The development of Decentralized Finance (DeFi) is moving very fast. The future of finance industry will be disrupted by DeFi, it is important to understand what is probably to happen in the next years. It will change by 100%, from central financial organizations to decentralized organizations. (Lacasse, Lambert, & Khan, 2018, p. 41)

MakerDAO, a stablecoin-based lending platform, is recognized as the first widely used DeFi application. Compound Finance began paying cryptocurrency lenders and borrowers on its platform in June 2020, in addition to standard interest payments, with units of a new cryptocurrency known as the COMP token, which is used for platform governance, but is also tradable on exchanges. (Sabry, 2021, pp. 10-11)

Other platforms quickly followed suit, ushering in the phenomenon known as yield farming or liquidity mining, in which speculators actively move cryptocurrency assets between different pools within a platform and between platforms in order to maximize their total return which includes not only interest and fees, but also the value of additional tokens received as rewards. (Sabry, 2021, pp. 10-11)

The Washington Post published an introduction on decentralized finance in July 2020, containing information on yield farming, investment returns, and the dangers involved. Bloomberg reported in September 2020 that DeFi accounted for two-thirds of the decentralized finance market. cryptocurrency in terms of price movements, and that DeFi collateral levels had reached \$9 billion. Due to the growing interest in DeFi Ethereum saw an increase in the number of developers in 2020.

The DeFi movement began gaining traction in the aftermath of the financial crisis of 2008. Although some of the foundational concepts were developed earlier and there had been other attempts to create a digital currency predating that event, the events of 2008 were really the catalyst for innovators to finally try to do somethings about their growing displeasure with traditional financial industry.

(Yavin & Reardon, 2020, p. 7)

DeFi seek to build a better financial landscape made possible by the evolution of the blockchain technology, particularly in three key segments of the banking system, which are payment and clearance system (remittance), accessibility, centralization and transparency. (Warwick, 2021).

From the above, it can be concluded that 2020 year is the booming of DeFi's industry.

II.2 The definition of Decentralized finance (DeFi)

There are many definitions of decentralized finance, the most important of which can be mentioned as follows:

II.2.1 Decentralized Finance is "a global, open alternative to the current financial system, based on open-source technology that anyone can program with" (Sabry, 2021, pp. 10-11)

II.2.2 Decentralized finance is "an emerging ecosystem of financial applications and protocols built on blockchain technology with programmable capabilities, such as Ethereum and Solana. The transactions get executed automatically through smart contracts on the blockchain, which includes the agreement of the deal". (Zhang, 2021)

II.2.3 DeFi, refers to "a transformative movement that aims to revolutionize the traditional financial system by leveraging blockchain technology and smart contracts" (McNaught, 2023, p. 10).

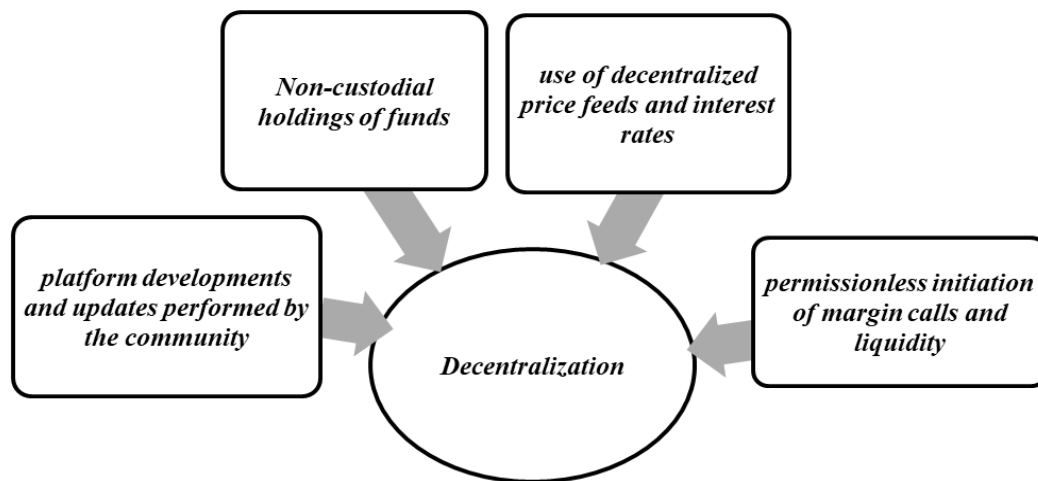
II.2.4 The last definition, is the definition offered by The Global Future Council on Decentralized Finance: "Decentralized finance is the application of decentralized technology to financial services, aspiring to provide solutions to and potentially beyond existing financial services". (Global Future Council on Decentralized Finance, 2025)

Accordingly, and through the above DeFi can be defined as: "a financial service offered on a public blockchain, it is a popular blockchain based financial infrastructure, in general the word refers to a protocol stack that is open, permissionless and highly interoperable".

The best DeFi Protocols are: MakerDao, Dydx Aave, Lido, UniswapV3, Compound, EigenLayer, Nexus Mutual, Curve, Pendle and Venus

There are common features of decentralization that include important components, which are shown in the following figure:

Fig (1): The common traits of decentralization



Source: By authors depending on Yavin, On, Aj Reardon, 2020, p: 25

II.3. DeFi building blocks

DeFi relies on decentralized programs, also known as DApps, that execute financial activities on distributed ledgers known as blockchains, a technology popularized by Bitcoin and since adopted more generally.

DApps are often accessed through a Web3 compatible browser program, such as MetaMask which allows users to directly interact with the Ethereum blockchain through a digital wallet.

So, DApp is an abbreviation for Decentralized application, and it is an open-source which means that the source code of the App is available to be viewed by anyone, although they can only contribute to the code if it is hosted on a public forum like GitHub, and ultimately on the Ethereum address associated with the code can apply changes to the live code.

As a reminder, each DApp has its backend code running on a decentralized peer to peer network such as Ethereum blockchain network, in the other hand, an app's backend code is running on centralized servers.

DeFi uses a multi-layered architecture, every layer has a distinct purpose and the layers build on each other and create an open and highly composable infrastructure that allows everyone to build on, rehash or use other parts of the stack. It is also important to understand that these layers are hierarchical: they are only as secure as the layers below. (Schär, 2021).

II.3.1 As shown in Figure below, the settlement, asset, protocol, application, and aggregation layers are five layers that make up the structure of DeFi;

II.3.2 The settlement layer (Layer 1) consists of the blockchain and its native protocol asset;

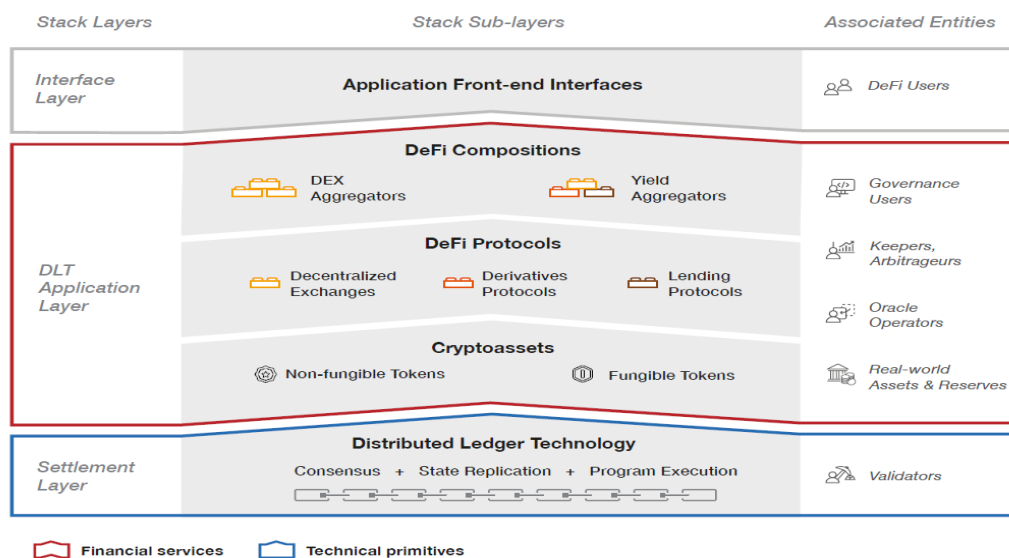
II.3.3 The asset layer (Layer 2) consists of all assets that are issued on top of the settlement layer.;

II.3.4 The protocol layer (Layer 3) provides standards for specific use cases such as decentralized exchanges, debt markets, derivatives, and on-chain asset management;

II.3.5 The application layer (Layer 4) creates user-oriented applications that connect to individual protocols;

II.3.6 The aggregation layer (Layer 5) is an extension of the application layer. Aggregators create user-centric platforms that connect to several applications and protocols, as shown in the following figure:

Fig (2): DeFi building blocks (DeFi Stack Reference (DSR) Model)



Source: Raphael Auer and others, 2023, p: 5.

II .4. Main characteristics of Decentralized Finance

There are many key features differentiating DeFi from traditional financial (TradFi) markets as follows: (Voon Kiong, pp. 68-69)

II .4.1 P2P transactions and Non-custodial: The non-custodial nature of DeFi is one of its main features. In DeFi applications, no central authority or other intermediary;

II .4.2 No need KYC: anyone can open an account with a DeFi platform instantly and easily. Most DeFi protocols are open-source and allow the community to review and further develop the code underlying the protocols;

II .4.3 Composable: This is one of the most important innovations brought by DeFi. Existing components of DeFi networks can be combined to create new applications, and no one holds your digital assets-DeFi platforms are non-custodian in nature.

II .5 The advantages of Decentralization

Decentralized finance is considered one of the most prominent uses of the web3, as companies can integrate decentralized finance with the open web ecosystem to build solutions and applications by reducing transaction fees, processing them efficiently, and providing a more transparent governance system.

There are several advantages to decentralized finance, which can be

mentioned as follows: (Voon Kiong, pp. 68-69)

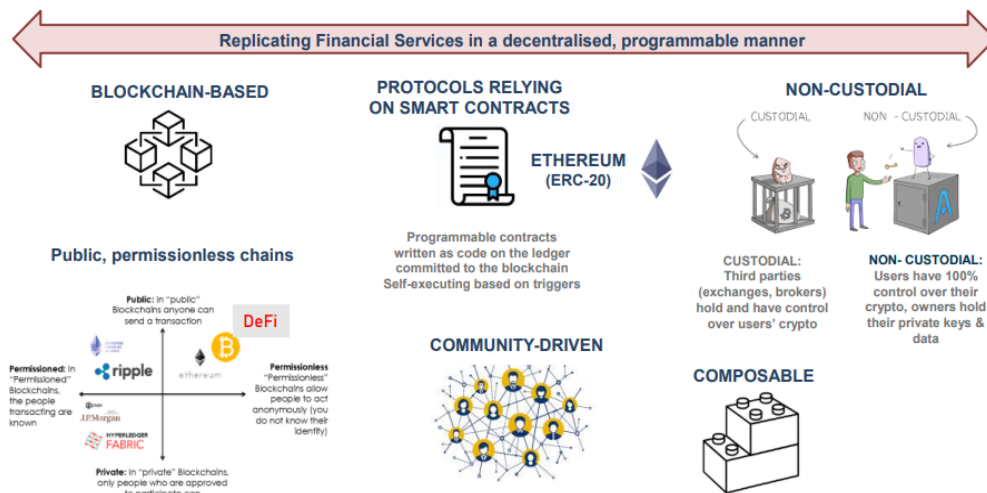
II .5.1 Financial sovereignty and maintain full control of the Digital Assets;

II.5.2 Increased and enhanced Accessibility specially for unbanked and underbanked population, because DeFi is borderless and permissionless;

II .5.3 The absence of access restrictions provides a neutral foundation that cannot discriminate between use cases nor stakeholders;

II .5.4 DeFi is built on a layered infrastructure. A decentralized ledger does not mean that everything deployed on top of it must be equally decentralized as shown in the following figure.

Fig (3): Main characteristics of DeFi applications



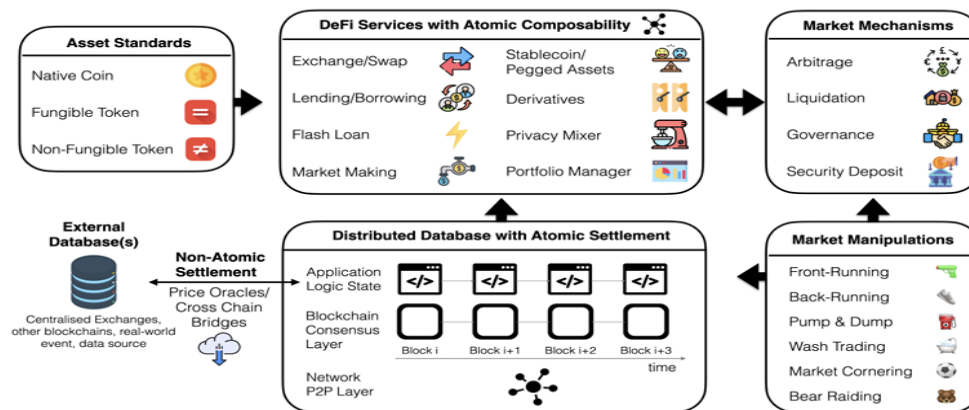
Source: OECD, 2022, p: 19.

II .6 Blockchains and DeFi

The inception of Bitcoin in 2009 and for the first time in history, users are able to send and receive online financial assets, without passing through third parties, such as intermediaries.

Crucially, Bitcoin introduced the concept of a time-stamping blockchain, which allows to determine the precise time and order at which a transaction should execute. This time-stamping service is critical to the execution of financial assets and allows to unmistakably derive how many financial assets which account holds at which point in time. Bitcoin's blockchain therefore allows its users to act as the custodian of their own assets, effectively retaining control over their assets. So, DeFi builds upon a distributed blockchain database, enabling atomic transaction settlement as shown in the figure below.

Fig (4): High-level systematization of Decentralized Finance.



Source: OECD, 2022, p: 20.

II .7 Challenges and risks

There are many advantages to be gained from DeFi, but there are also challenges to be considered: (Chen & Bellavitis, 2022, pp. 17-18)

II .7.1 First, there is the risk of decentralization theater, because in many cases DeFi protocols are subject to centralized data feeds and can be shaped or influenced by people with "admin keys", so it is important to strictly differentiate between true decentralization and companies that claim to be DeFi when in fact they provide centralized infrastructure;

II .7.2 Second, immutability can introduce new risks. It might be harder to enforce investor protection, and smart contract programming errors can have devastating consequences.

II .7.3 Third, the transparent nature of the blockchain and decentralized block creation can be problematic from a privacy perspective. Moreover, it allows for the extraction of rents through generalized front-running—a phenomenon known as miner/maximal extractable value (MEV), so DeFi still faces many challenges. However, it can also create an independent infrastructure, mitigate some risks of traditional finance, and provide an alternative to excessive centralization.

II .8 Practical tools in DeFi risk: there are many tools for managing central finance risks, including: (Shamrock, 2021, p. 18)

II .8.1 The use data in Ethereum blockchain with Etherscan to monitor the wallet transactions and input your Ethereum wallet address;

II .8.2 The use Coingecko to get the most recent information on cryptocurrencies as well as the most recent price changes;

II .8.3 The zapper platform aims to make fund management easier in DeFi;

II .8.4 The use the Zerion platform to conduct all key activities in DeFi via a good user interface, so it is a useful tool to controlling critical processes in DeFi ecosystem;

II .8.5 The benefit from the new DeFi services in lending by using the Instadapp platform;

II .8.6 Furucombo allows to do several transactions in one;

II .8.7 you may browse and get rapid and classified access to decentralized applications by using dapp radar.

II.9. Between Traditional Finance and Decentralized Finance

Traditional finance and decentralized finance represent two distinct models of financial systems with significant differences: (McNaught, 2023, p. 10)

II.9.1 Intermediaries: traditional finance relies on intermediaries to facilitate transactions and provide financial services, in contrast DeFi aims to minimize or eliminate intermediaries, allowing for direct peer to peer transactions and disintermediation of financial services;

II.9.2 Control and ownership: traditional finance often involves relinquishing control and ownership of financial assets to intermediaries. DeFi, on the other hand provides users with full control and ownership of their assets through self-custody wallets and smart contracts;

II.9.3 Accessibility and inclusion: traditional finance systems may have barriers to entry, these barriers can exclude individuals who lack access to traditional banking services. DeFi, its open and permissionless nature, aims to provide financial services to everyone with an internet connection, enabling global financial inclusion;

II.9.4 Innovation and programmability: while traditional finance has undergone technological advancements, innovation is often constrained. DeFi built on blockchain technology, fosters innovation through open-source development.

The following table summarize the most important differences between traditional finance (TradFi) and decentralized finance (DeFi):

Table (1): A comparison Between traditional finance and decentralized finance

DeFi	TradFi
You hold money.	Your money is held by companies.
You control where your money goes and how it's spent.	You have to trust companies not to mismanage your money, like lending to risky borrowers.
Transfer of funds happen in minutes.	Payments can take days due to manual processes.
Transaction activity is pseudonymous.	Financial activity is tightly coupled with your identity.
DeFi is open to anyone.	You must apply to use financial services.
The markets are always open.	Market close because employees need breaks.
It's built on transparency -anyone can look at a product's data inspect how the system works.	Financial institutions are closed books: you can't ask to see their loan history, a record of their managed assets, and so on.

Source: Decentralized finance (DeFi), ethereum.org/en/defi/ visited on: 27/9/2025.

II.10. The 2025 Global Crypto Adoption Index Top 20

DeFi has been a gradually growing industry since the beginning of 2019. The DeFi market achieved a successful level by providing financial products and services built as decentralized applications. The real start of this market was in the summer of 2020, referred to as "the DeFi summer", with the appearance of DeFi applications. This attracted several retail investors through high levels of risk, as well as the adoption of crypto-assets by institutional investors and other traditional financial service providers, which led to an interrelationship between the CeFi and DeFi systems.

The increasing use of stablecoins, tokenized and digital assets make the boundaries of the two systems more porous and increases risks of spillovers to the traditional financial system and the real economy. (OCDE, 2022, p. 15). The use of DeFi, was highest in countries that traded or moved large amounts of cryptocurrencies, including the India and USA. This is a different conclusion when compared to a country ranking on cryptocurrency ownership worldwide: consumers from developing countries where much more likely to own crypto than those from developed countries. The following table summarize the 2025 global crypto adoption index top 20. (chainalysis, 2025)

Table (2): The 2025 Global Crypto Adoption Index Top 20

Country	Overall index ranking	Retail centralized service value received ranking	Centralized service value received ranking	DeFi value received ranking	Institutional Centralized service value received ranking
India	1	1	1	1	1
United States	2	10	2	2	2
Pakistan	3	2	3	10	3
Vietnam	4	3	4	6	4
Brazil	5	5	5	5	5
Nigeria	6	7	8	3	8
Indonesia	7	9	7	4	7
Ukraine	8	4	6	8	6
Philippines	9	6	9	13	10
Russia Federation	10	8	10	9	11
United Kingdom	11	27	12	12	9
Ethiopia	12	16	19	7	20
Bangladesh	13	14	15	14	14
Turkey	14	11	13	22	12
Korea, Rep	15	12	11	24	13
Yemen Rep	16	15	16	21	16
Thailand	17	21	17	15	17
Venezuela, RB	18	13	14	37	15
Japan	19	17	20	16	27
Argentina	20	18	18	29	19

Source: The 2025 Global Crypto Adoption Index Top 20

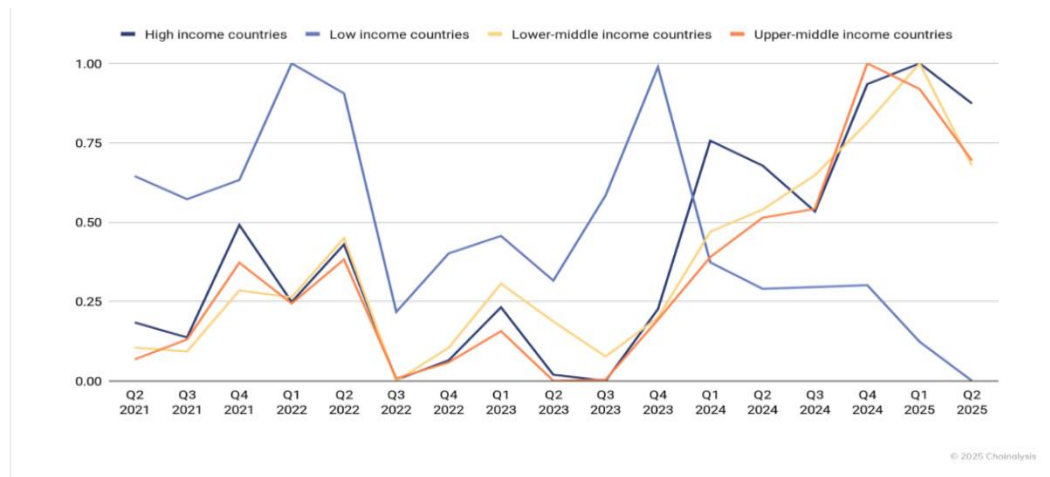
From the table above, in 2025, Asia-Pacific (APAC) countries, led by India, Pakistan, and Vietnam, have large-scale adoption of both centralized and decentralized services. On the other side, North America holds the second position globally; by means of the approval of spot Bitcoin ETFs and clearer institutional

frameworks, it has helped legitimize and accelerate crypto participation across traditional financial channels.

The Total Value Locked (TVL) represents the total value of all cryptocurrency that is locked, or stored, in a DeFi application (DApp) or smart contract. (Ozili, 2022, p. 120)

The crypto adoption is truly global, so, the adoption is spread across almost all income brackets.

Fig (5): Global Index score by country income bracket, Q2 2021-Q2 2025



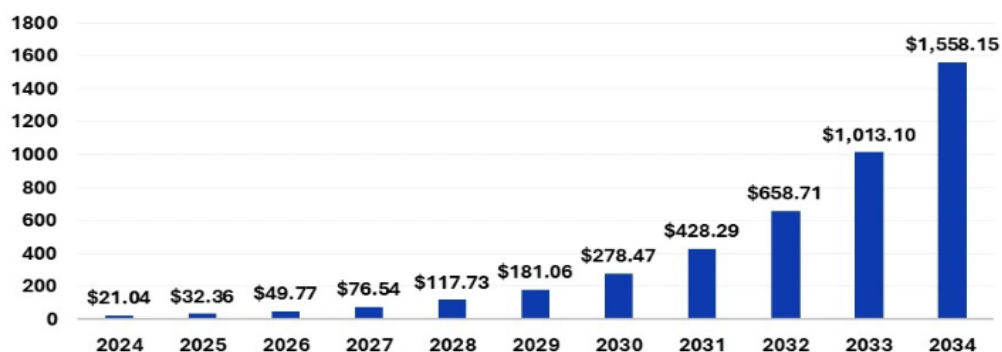
Source: The 2025 Geography of Crypto Report, Chainalysis, p: 12.

II.11. The DeFi market

The DeFi market has witnessed rapid growth, significantly influenced by the general adoption of blockchain technologies and smart contracts.

II.11.1The global DeFi market is set to experience excitable growth, projected to rise from \$21.04 billion in 2024 to an estimated \$1,558.15 billion by 2034. This translates to an astounding 40% compound annual growth rate (CAGR) over the next decade, showcasing the rapid adoption of DeFi solutions worldwide. Like it showed in the figure below.

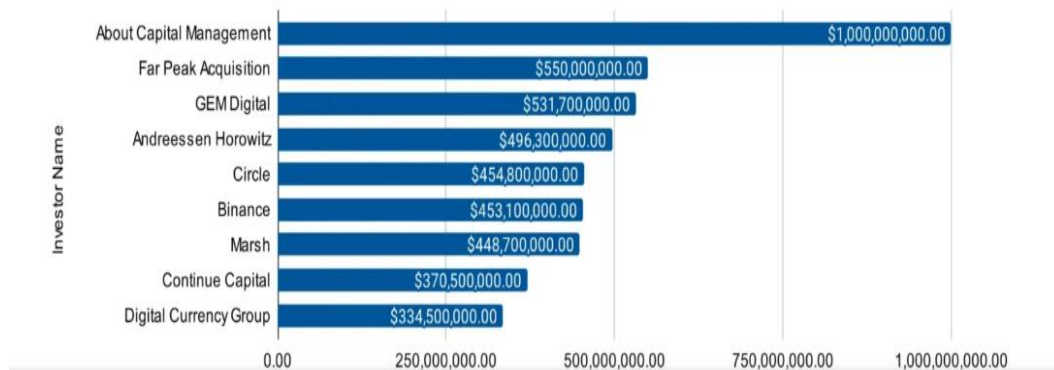
Fig (6): DeFi market



Source: David R. Prasser, Decentralization Market Report 2025: Key Data & Insights, January 23, 2025, www.startus-insights.com/innovators-guide/decentralization-market-report

II.11.2 Top investors demonstrate major financial backing and confidence in the decentralized finance market with a combined investment worth about USD 5.30 billion. The top DeFi's investors are showed in the figure below:

Fig(7): Top Decentralized Finance investors (All time)



Source: David R. Prasser, Decentralization Market Report 2025: Key Data & Insights, January 23, 2025, www.startus-insights.com/innovators-guide/decentralization-market-report/

II.12. Tokenisation, NFTs and the DAO ecosystem

Generally known as "tokenization", "digital securitization" refers to the creation of the digital representation of an asset (called a token) on one or more distributed ledger technologies (called blockchain (Laurent & et autres, 2018).

Asset tokenization is a method that converts the rights to an asset into a token. The tokens are issued on a blockchain platform that supports smart contracts, so that the tokens can be freely traded on various exchanges (elivise, 2020)

Through what was mentioned previously, tokenization makes it possible to materialize and enhance existing assets from the physical world to the digital world. (Benalkama, 2020, p. 248)

A DAO Decentralized Autonomous Organizations, allow us to work with like-minded folks around the globe without trusting a benevolent leader to manage the funds or operations.

The backbone of a DAO is its smart contract, which defines the rules of the organization and holds the group's treasury. Once the contract is live on Ethereum, no one can change the rules except by a vote. This means that DAOs don't need a central authority. So Ethereum is the perfect foundation for DAOs for a number of reasons: (Ethereum, 2023).

To overcome information asymmetry in decentralized markets, public and private sector entities seek to maximize their comparative advantages. In that context, the public DAO infrastructure interacts with private application owners and related users, leveraging tokenization processes known as "SoulBound" and public prediction platforms to mitigate information asymmetry risks within a flexible and innovative regulatory environment. (Voloder & others, 2025, p. 5)

So, the core components of the DeFi Ecosystem are: Decentralized Exchanges (DEXs) Platforms like Uniswap, SushiSwap, and Curve Finance allow users to trade tokens without relying on centralized authorities. These exchanges utilize Automated Market Makers (AMMs), creating liquidity pools that facilitate token swaps with minimal slippage. (decentralized-finance, 2024).

Lending and Borrowing Protocols: Projects like Aave, Compound, and MakerDAO provide decentralized lending services, enabling users to lend assets and earn interest or borrow by collateralizing their crypto holdings. MakerDAO also introduces DAI, a stablecoin pegged to the U.S. dollar, backed by over-collateralized loans.

Yield Farming and Staking: Yield farming protocols like Yearn Finance and staking solutions such as Lido allow users to maximize returns by earning yields on staked or deposited assets. These protocols optimize returns through automated strategies and liquid staking options.

Derivatives and Asset Management: Ethereum hosts several derivatives protocols like Synthetix, which offers synthetic assets, and dYdX, which enables decentralized margin trading. Asset management protocols like Set Protocol and Enzyme provide tools for creating and managing investment strategies.

III. Conclusion

This research paper addressed general concepts about decentralized finance and what distinguishes it from traditional finance. So, DeFi is the most important development in the crypto-asset sphere, and aims to recreate the traditional financial system. Unlike DeFi which operates on blockchain protocols, TradFi makes banking institutions central to all transactions.

DeFi represents a real revolution in the world of finance, offering users the potential for greater financial autonomy and inclusivity by leveraging blockchain technology. As the DeFi space continues to evolve, it is crucial for users to stay informed about the risks and opportunities presented by this transformative financial ecosystem. DeFi has the potential to reshape traditional finance and pave the way for a more decentralized and inclusive global financial system.

DeFi platforms, also known as protocols, are built on top of smart contract and can fulfill specific financial functions determined by the smart contracts' underlying code. So, there are major categories of DeFi like stablecoin, decentralized lending and borrow, Decentralized Exchange, decentralized fundraising. Despite all the advantages that decentralized finance offers, there are many risks that must be taken into consideration.

Among the most important results is the existence of crucial differences between decentralized finance and traditional finance. DeFi offers more access, transparency, and innovation, in the other hand traditional finance provides stability, regulation and a proven system.

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