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Decentralized Finance – Challenging the Traditional Banking Sector

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ABSTRACT:
Perinteinen pankkimaailma on osoittautunut talouden keskeiseksi tukipilariksi. Pankkien tehtävänä on allokoida ja välittää rahoitusta tehokkaasti rahoitusmarkkinoilla. Ilman toimivaa pankkisysteemiä markkinatalouden olisi mahdotonta toimia optimaalisesti.

Taustalla on kehittynyt uudenlainen teknologia nimeltään lohkoketjut. Lohkoketjuteknologian tarkoitus on vähentää erilaisten järjestelmien keskittynyttä luonnetta. Se voi vaikuttaa useaan eri alaan, mutta erityisesti pankkimaailmassa on alettu etsiä keinoja talouden tehokkuuden edistämiseksi, ja tähän lohkoketjut nähdään vastaukseksi. Vaikka pankit ovatkin keskinen osa kansantaloutta, ne voivat olla toiminnoissaan hyvin hitaita ja kalliita sekä keskittyneen luonteen takia korruptoituneitakin. Lohkoketjuteknologian avoin ja hajautettu luonne on tapa korjata pankkimaailman puutteita ja tähän, niin sanottuun hajautettuun rahoitukseen, syvennymme tutkielmassa perusteisesti.

Koska lohkoketjuteknologian hyödyntäminen käytännön tasolla on vielä toistaiseksi todella vähäistä, on tässä tutkielmassa vaikea syventyä konkreettisiin, käytännön esimerkkeihin. Sen sijasta käymme läpi useiden lähteiden pohjalta sen eri mahdollisuuksia, suunnitelmia ja spekuloitua tulevaisuuden käyttöä. Toisaalta se data, mitä tutkielmassa esitetään, on kerätty viimeisiltä vuosilta ja on siten erittäin ajankohtaista. Selvää on kuitenkin se, että lohkoketjut ovat tulleet jäädäkseen ja niiden kansainvälinen adoptointi käyttöön on vain ajan kysymys, mikä tekee aiheesta kiehtovan.

Tutkielman tutkimusongelman voisi kiteyttää seuraaviin kysymyksiin: Mitkä ovat lohkoketjupohjaisen rahoitusmarkkinan vaikutukset perinteisiin pankkeihin, ja miten pankit ovat alkaneet kehittämään toimintaansa ja adoptoimaan lohkoketjuteknologiaa osaksi heidän päivittäistä toimintaansa?

Keskeisimpänä lopputulemana on se, että lohkoketjuteknologia kokonaisuutena on todella potentiaalinen tekijä muovaamaan rahoitusmarkkinoita paljon tehokkaampaan suuntaan. Sen edut tulevat esiin etenkin nopeudessa sekä taloudellisen osallisuuden lisäämisessä. Lohkoketjuja on alettu tutkimaan pankkien toimesta muun muassa tokenisoinnin sekä digitaalisen keskuspankkirahan kehittämisessä. Potentiaali on suuri, mutta etenkin lainsäädännön näkökulmasta sillä on vielä paljon heikkouksia ottaakseen keskeisen roolin rahoitusmarkkinoiden toiminnassa.

KEY WORDS: blockchain, decentralized finance, cryptocurrencies, smart contracts, traditional banks

Contents

1 Introduction

To introduce foundational ideas of this thesis, we refer to a pivotal statement by the anonymous author Satoshi Nakatomo:

> "Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weakness of the trust-based model (Nakamoto, 2008, p.1)."

That is how the original Bitcoin whitepaper kicks off, created by inspiration from the 2008 financial crisis. In Bitcoin's whitepaper, the author argues that electronic, cryptographic proof-based systems can replace the trust that endorses transactions in traditional finance and thus prevent crises like this (Aquilina et al, 2023). More about Bitcoin later, but the quoted sentence summarizes the sole problem for which a solution has begun to be sought, and this study explores that solution from the perspective of blockchain-based financial markets known as decentralized finance (DeFi).

1.1 The Purpose of the Study

Decentralized finance is a name for the new, broader blockchain-based financial ecosystem, that is designed to create a transparent, efficient, and decentralized financial infrastructure (Shah et al., 2023). Despite its having relatively quick adoption worldwide, it is still a very unknown concept amongst most people, and its advantages over traditional banks are not yet properly understood. The research problem of the thesis could be summed up in the following questions: What are the benefits of DeFi over traditional banking systems in terms of accessibility, efficiency and transparency? What types of protocols are used in DeFi to achieve this advantage? How are

traditional banks responding to the emergence of DeFi? The purpose of the study is to delve deeper into these questions and study the differences between DeFi and traditional banking systems, providing insights into the interesting, but potentially very significant DeFi infrastructure.

2 Understanding the DeFi Infrastructure

To begin with, traditional banks are essential pillars of the financial system. They have several tasks and the most important of those is to act as intermediaries between savers and borrowers. The main purpose of banks is they gather deposits from individuals and institutions with extra funds and lend these funds to individuals and institutions in need of capital. This intermediation function allows the efficient allocation of capital in the economy (Fama, 1980).

However, those traditional banks have many flaws that have led to the research and development of alternative financing solutions. This also comes from the fact that the world and the technologies evolve all the time, and people are constantly trying to find ways to execute, in this case, financial matters more efficiently and securely. As highlighted by Far et al (2023), the evolution of the internet has generated significant changes for various businesses and has allowed the development of many new and innovative business models that have gained attention among people all over the globe. Despite many advantages that the evolution of new technologies has provided to people, businesses, and industries, it has also meant that many traditional jobs are in danger of disappearing. Because of this, entrepreneurs and different institutions affected by this, such as banks, must stay aware of recent technological developments and adapt to these changes. They need to remain competitive and maintain their status as the pillars of the economy.

When discussing the actual flaws of traditional banks, the biggest issue that new technologies are trying to solve is the so-called centralization of banks. In this case, centralization means, in short, operating within a financial system that is controlled by only a few institutions (Alamsyah & Muhammad, 2024). This can lead to several problems such as manipulation and lack of transparency within the banking system, of which the 2008 financial crisis is a good example from recent history. Centralization may also lead to situations like significant monopoly power, where one having too much control can limit competition, innovation and consumer choice within the

ecosystem (Campbell et al. 2021). Traditional banks have many flaws which we will discuss in more depth later, and many of those have started to be tackled through the emergence of decentralized finance (DeFi).

Next, we will discuss key innovations that make up the whole DeFi ecosystem such as the actual blockchain technology, cryptocurrencies, oracles, smart contracts, decentralized applications, and stablecoins, and we will clarify the basic terminology related to them. This is important because if we understand the different aspects of decentralized finance, it will be easier to understand the actual benefits they bring.

2.1 Blockchain Technology

Blockchain technology was first theorized in 1991 but fully realized when Bitcoin was created in 2008 by an anonymous author named Satoshi Nakamoto, as a response to the same year's financial crisis. Bitcoin quickly became a revolutionary technology among people who acknowledged it as it could promote democracy within computer-based systems and digital communities without needing to trust third-party intermediaries. Bitcoin was the starting point for leveraging blockchain technology and the technology has evolved continuously over the years (Saeed et al., 2023).

Blockchain's main idea is to provide a decentralized platform for all different cryptographic protocols such as cryptocurrencies, smart contracts, and DeFi applications. What makes blockchains a unique technology is that they allow multiple parties to interact with each other, but without actually needing to trust each other. The ledgers on blockchains are designed to track all types of data in a transparent and secure way (Saeed et al., 2023).

Blockchains use so-called consensus mechanisms for decision-making, which are a set of predefined rules that determine how transactions are validated and added to the blockchain. In this way, no single entity has power, anyone can participate in the

operations and everything in the process is transparent. The original consensus mechanism is called Proof of Work (PoW). In PoW, validators rely on a computational lottery to determine which block to add. Usually, the longest chain of blocks can eventually become part of the blockchain. This process also minimizes the risk of misuse of the blockchain as altering transactions would require a majority–51 percent– of the network's computational power. Hence, the risk of a successful 51 percent attack is small, although not impossible (Campbell et al., 2021).

Campbell et al (2021) also highlight another consensus mechanism, as Proof of Stake (PoS) being the most significant and common of those. In Proof of Stake, users commit some capital (the stake) to attest the validity of the block. In short, users make themselves available by staking their tokens and then they could be selected to propose a block. To become part of the block, the proposed block needs to be attested by the majority of other users. Users make money by both proposing the block as well as attesting the validity of blocks proposed by other users (Campbell et al., 2021).

2.2 Cryptocurrencies

Cryptocurrencies are at the base of all DeFi transactions. Cryptocurrencies are built for these decentralized platforms and unlike traditional banking systems, they have no single person, company, or any other institution controlling them. The ledger, or a record of transactions, exists in a public domain, so all the processes are transparent and accessible to anyone. All DeFi applications are built upon decentralized platforms that utilize cryptocurrencies in their transactions, making sure various financial activities such as investing, lending, and borrowing can occur in a similarly decentralized manner without any intermediation from third parties. (Alamsyah & Muhammad, 2023).

Essentially, cryptocurrency is a digital token, often limited in supply, that is secured and transferred through cryptographic techniques. Unlike traditional digital assets that can

be easily copied, cryptocurrencies are labeled as scarce. This was also highlighted by the former CEO of Google, Eric Schmidt, who described Bitcoin as a “remarkable cryptographic achievement” and highlighted, that the ability to create something that is not duplicable in the digital world has massive value (Campbell et al., 2021).

The protocol used to protect the accounts containing cryptocurrencies is called *asymmetric key cryptography*. Its purpose is to make sure that no one can post false transactions or cause any other offense without the ownership of the account. When using these accounts, you have a “public” key for receiving tokens and a “private” key for operating with them. This system makes sure everything is secure, similar to how credit card information is protected online. The ledger records all transactions, preventing traditional problems like double spending which can be seen as a big advantage for blockchain technology (Campbell et al., 2021).

Campbell et al (2021) describe Bitcoin as the first, revolutionary cryptocurrency. Although Bitcoin has great fundamentals and the technology is great, the competition increases all the time as other crypto companies can offer better and newer technologies. Still, Bitcoin is seen as the pioneer in the crypto world and is considered the safest asset in the crypto space.

Image 1. The Bitcoin price chart over the years (CoinMarketCap, 2024).

2.3 Smart Contracts

Smart contracts take decentralization to the next level by automating the entire process of financial activities as lending, borrowing, and trading happen on the blockchain without any intermediaries. The idea of smart contracts is that there are predefined rules and conditions in the contracts, and financial activities can only happen when these conditions are triggered. Smart contracts function without anyone having control over them, except when defining the conditions in the first place (Zou et al, 2021).

Ethereum is a good example of a smart contract platform as it is the second biggest crypto project behind Bitcoin and the pioneer in using smart contracts on its blockchain. An interesting feature of Ethereum, that is not usual for all smart contract platforms, is the transaction fees, known as gas fees. Ethereum is a massive computer, where you can build various applications using smart contracts, for example, different DeFi applications. To use these applications, users must pay a fee for each

computational task they execute. The gas fees are usually low for simple tasks like sending ETH, the native token for Ethereum, which does not involve too much processing. When more complex operations are done on the platform, the gas fees can be relatively high (Campbell et al., 2021).

2.4 Oracles

Another key component of the DeFi infrastructure is the oracles. With blockchain systems having a closed nature, they cannot directly access data from the outside world. While this limitation was normal for first-generation blockchains like Bitcoin, it is a challenge for newer, second-generation blockchains such as Ethereum. This is because blockchains like Ethereum, as described earlier, utilize smart contracts in their operations, which require the fulfillment of pre-defined conditions, which usually depend on off-train information. As a key part of the second-generation blockchains, DeFi also suffers from this issue as it highly relies on smart contracts (Zhou et al., 2021).

Zhao et al (2021) describe oracles as the main solution to solve this challenge. Oracles work in such a way that they take off-chain data and transfer it forward to the on-chain smart contracts. Because of their importance, oracles have become integral components of the DeFi infrastructure, with their main task being to act as data providers and as a connection between the blockchain and the off-chain world. Oracles now play a big role across the whole DeFi infrastructure, including in DeFi lending and borrowing, decentralized exchanges, decentralized insurances, and digital payments. Thus, according to Zhao et al., (2021), the trustworthiness of oracles goes hand in hand with the trustworthiness of the associated DeFi project.

2.5 Decentralized Applications

The whole DeFi infrastructure consists of different decentralized applications (dApps). dApps are similar to traditional software applications except they operate on a decentralized smart contract platform and thus are also the backbone for the DeFi industry. Anyone can use dApps, and just like any other blockchain-based solution, they are not controlled by any single entity (Campbell et al., 2021). Let's discuss the most common dApps in the DeFi industry.

2.5.1 Decentralized Exchanges

Decentralized exchanges (DEXs) are exchanges built on blockchains, that allow direct trading of cryptocurrencies among its users without the involvement of intermediaries. On DEXs, users maintain full control over their wallets, private keys, and assets. Smart contracts are used in transactions, so the whole process is automated and there is no need for any manual validation or verification (Shah et al., 2023). The biggest decentralized exchange is called Uniswap, which is built on the Ethereum blockchain.

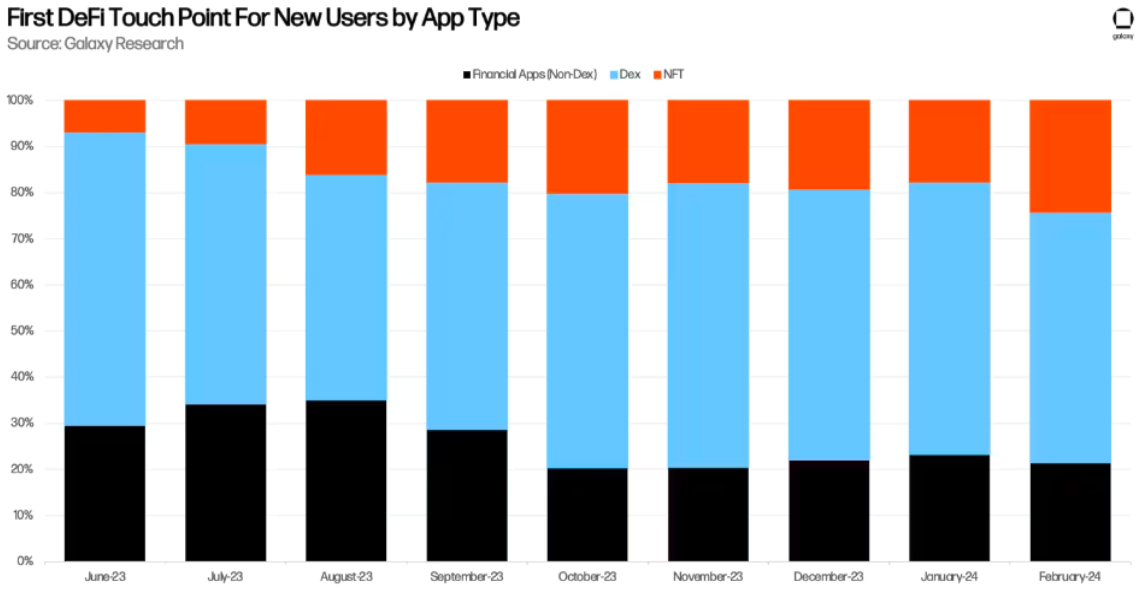

Image 2. First DeFi touchpoints (Galaxy Research, 2024).

Numerous applications built on different blockchains use these protocols, and that makes DEXs a fundamental element of the DeFi ecosystem. As can be seen from the picture above, DEXs are the primary place for users to get their first experiences in DeFi. Essentially, there are three primary types of DEXs: automated market makers, order book DEXs, and DEX aggregators, and what they all have in common is that they operate by leveraging smart contracts (Shah et al., 2023). Let's briefly touch on one of these, Automated Market Makers (AMMs), as they are the most suitable to describe the technical operations on DEX's. Prior AMMs, DEXs faced liquidity challenges, making regular trading difficult. AMMs solve this issue by forming liquidity pools and encouraging liquidity providers to deposit assets into these pools. Users then trade against the liquidity stored within smart contracts, used by a mathematical formula included in the smart contract to price assets. These liquidity providers can earn transaction fees by "staking" their assets (Shah et al., 2023).

2.5.2 Lending and Borrowing

Smart contracts enable users also to lend and borrow money directly with others, without any need for a bank intermediation. Usually, the smart contracts used in these platforms have predefined rules that allow lenders to get returns as they can earn interest on their crypto assets by lending them to others through so-called lending pools (Far et al., 2023). Aave is a good example of a decentralized lending platform, built on Ethereum.

These technologies enable anyone to act as a borrower or lender without the need for personal information, identity verification, or compliance with KYC (know your customer) requirements. Furthermore, borrowers and lenders maintain control over their funds without the need to transfer custody (Shah et al., 2023).

Although DeFi lending and borrowing platforms have many advantages, they can occasionally lead to impermanent losses. This occurs when the price of a cryptocurrency held in a liquidity pool changes (Far et al. 2023).

2.5.3 Derivatives

Derivatives offer many advantages in financial markets that make them highly attractive for investors, such as increased exposure with minimal initial investments. The main purpose of derivatives is simple: people use them for hedging and speculation. In DeFi, smart contracts allow the creation of derivative contracts between parties without requiring intermediation, which also makes derivatives available for a wider range of individuals with other benefits as well. Additionally, derivatives in DeFi increase innovation for new financial products, as you can make derivatives for all kinds of underlying assets (Shah et al., 2023). Derivatives in DeFi, just as in traditional finance, typically fall into three categories: Futures, Options, and Swaps.

2.6 Stablecoins

Despite cryptocurrencies having many advantages compared to traditional, centralized currencies, it is such a new and unregulated industry which means there are downsides as well. One of those is their high volatility, which can be uncomfortable for people who are not used to the risk associated with those cryptocurrencies. To solve this challenge, a category of cryptocurrencies known as stablecoins has been developed. Stablecoins are designed to maintain a fixed value relative to some target asset, usually the USD or gold. By offering price stability, stablecoins enable investors to use many DeFi applications and allow a cryptocurrency-native solution for exiting positions in more volatile crypto assets (Campbell et al., 2021).

Image 3. Tether price against USD over the last year (CoinMarketCap, 2024).

As Liao & Caramichael (2022) state, there are three types of stablecoins. Firstly, there are public reserve-backed stablecoins, that are backed by cash-equivalent reserves, such as deposits, T-bills and commercial papers, and are issued by centralized firms. Examples of those are the most popular stablecoins, Tether, and USD Coin (USDC). Secondly, there are public algorithmic stablecoins, that are backed by overcollateralized cryptocurrencies and/or smart contracts that automatically defend the peg by buying or selling the stablecoin. Examples of those are coins called DAI and TerraUSD. And thirdly, there are institutional or private stablecoins, that are issued by financial and non-financial institutions.

3 DeFi vs Traditional Banking System

In this chapter, we will explore the solutions that DeFi offers to address the flaws of the traditional banking systems in more detail. These solutions are increased accessibility and efficiency. We will also discuss how traditional banks have responded to this increased competition and intend to remain competitive in the future. As an addition, this thesis is written before the possible election of Trump, who, as a crypto-friendly president, could have many massive, but as of yet unknown, impacts on the concrete utilization of blockchain technology in the USA and thus around the world.

3.1 Accessibility

The first flaw of traditional banking system is the limited access it provides to millions of people worldwide. The current financial system is easily manipulates people into facing high fees, inefficiencies, deceit, fraud, and corruption. Moreover, it remains largely inaccessible to millions of people. According to the report from 2021 by the World Bank Group, approximately 29 percent of the people living in developing economies do not have ownership of a bank account (World Bank Group, 2021).

Many people continue to see large financial intermediaries such as banks, exchanges, and insurers as the main pillars of the economy that establish trust throughout the world. These intermediaries have significant power, which also means that they can exclude whomever they want from using their operations and services. Another statistic comes from Abdulhakeem & Hu (2021), who state that the current banking system remains inaccessible to millions worldwide, with 31 percent of adults globally still lacking access to banking services. This lack of access is due to factors such as centralization, geographical remoteness and high fees. According to them there is a strong correlation between poor and unbanked people, with 75 percent of the unbanked people considered poor and are unable to access essential social support services.

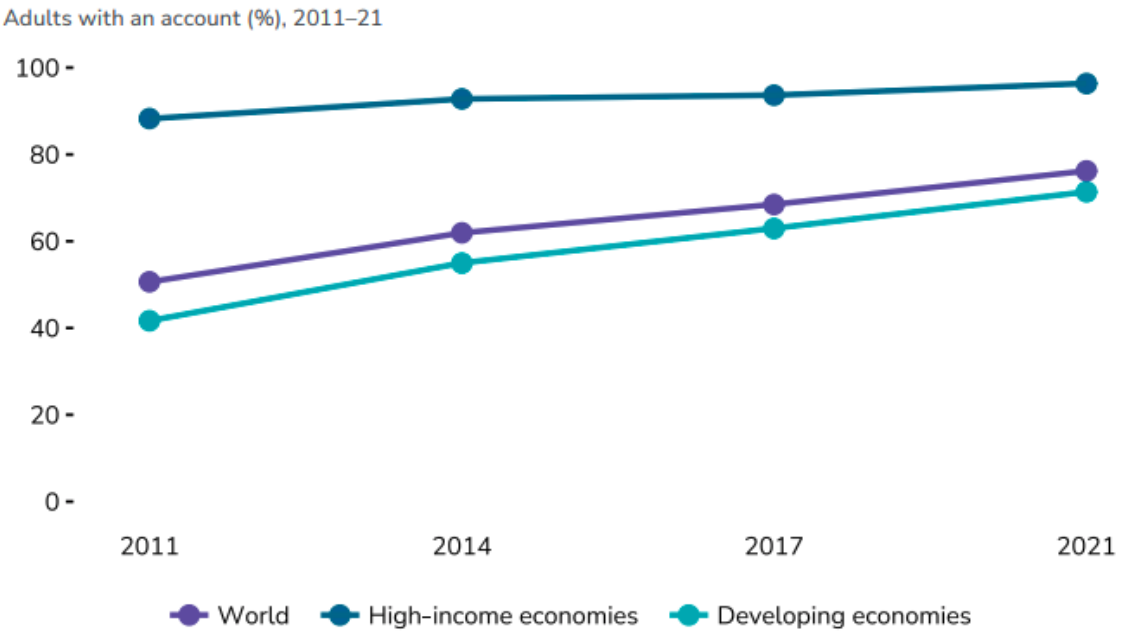

Image 4. Global account ownership throughout the years (Global Findex Database, 2021)

Access to basic financial services, including loans and check-cashing, is crucial for things like managing consumption and having safeguard against unexpectable events. Unfortunately, a significant portion of the population remains unbanked and this is where DeFi can step in and help with the inclusion of these services (Abdulhakeem & Hu, 2021).

DeFi comes in as a smart contract-based infrastructure that enables access to a wide range of users and addresses the problem discussed above. It opens up opportunities for large underserved groups of people, including the global population of unbanked and several small businesses, that may have difficulties with access to bank accounts, but which still employ a huge portion of people. For instance, in the United States small businesses employ nearly 50 percent of the whole country's workforce (Campbell et al, 2021). The direct access to financial services that DeFi provides has the potential to make a big, positive impact for these people.

Additionally, even people that have access to traditional financial services such as bank accounts and credit cards may not have access to all services such as the most competitively priced services or products as these are often reserved only for large institutions. DeFi solves this problem by giving every user access to its entire infrastructure, regardless of factors like wealth or geographic location (Campbell et al., 2021).

3.2 Efficiency

One of the biggest advantages DeFi brings to the financial ecosystem is its efficiency in all kinds of financial operations, which is not the case with traditional banking systems. DeFi simplifies high-volume financial transactions with low friction, which would typically pose significant organizational challenges for traditional banking sector. DeFi achieves this by deploying reusable smart contracts in the form of dApps designed to execute a specific financial activity. Anyone can use these smart contracts for any service they need, such as executing a call option, regardless of the size of the transaction. Users can do these transactions how they want, within the parameters of the smart contract. For example, on Ethereum based DeFi service, one transfer can cost 15 euros whereas in traditional finance the fee is much higher as it goes through multiple intermediaries (Campbell et al., 2021).

3.2.1 CBDCs

Traditional banks have started to explore their solutions for the increased competition from alternative financial systems regarding the efficiency of transacting money. The response of many banks to people's growing demands are going to be CBDCs (Central Bank Digital Currencies). This solution comes from people demanding faster or even real-time payments with minimal fees, driving the evolution of payment processes toward a more cash-lite or potentially even cashless economy. The idea behind CBDCs is that trust

is the most important factor in banking systems, and the private sector, with extreme volatility in their digital currencies, may not fully achieve the goal of establishing this trust among people. (Allen et al., 2021). As can be seen from the picture below, Jamaica, Bahamas and Nigeria have already launched their own digital currencies, while the European Union, the United States and the United Kingdom area all researching or developing their own ones, with the UK aiming to announce their own digital pound by 2025 or 2026.

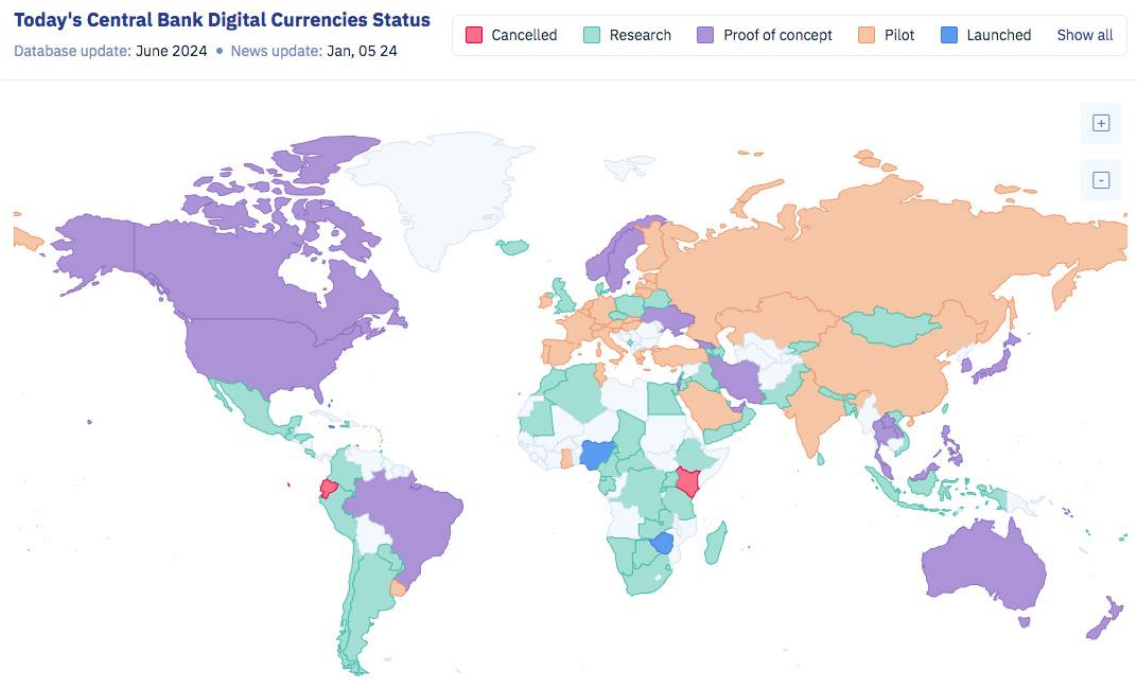

Image 5. CBDC's current status around the world (CBDCTracker, 2024)

However, central banks have their concerns about the potential consequence of issuing CBDCs on the banking sector. They worry about the risk of a bank run, as people may prefer holding accounts with the central bank, which can potentially destabilize the whole financial system (Allen et al., 2021). While CBDCs are not yet fully relevant, with the exception of a few countries, it is an example of how traditional banks are trying to adapt to changing demands and are ready to take advantage of new technology in their operations.

3.2.2 Case Ripple & XRP

Crypto company Ripple, with its token XRP, is a good example of how traditional banks are becoming aware of the benefits of blockchain technology and have started to partner with crypto companies to make their operations more efficient. There are many examples, but let's briefly discuss Ripple as it is closely related to CBDCs that we covered in a previous paragraph.

Ripple's mission is to build breakthrough crypto solutions for a world without economic borders. Its sector focused on cross-border payments aims to deliver real-time global payments without tying up capital in destination markets. In short, a payment platform developed by Ripple, Ripple Payments, is used by over 300 banks and financial companies for cross-border transactions. It is a comprehensive platform for managing and transacting CBDCs and stablecoins. Each its solution is built on a private ledger that is based upon XRP Ledger technology, and it has transacted over 70 million times over the course of 10 years (Ripple.com, 2024).

Ripple, with their token XRP, aims to use blockchain technology in their payment platform to increase the efficiency and reduce the costs of cross-border transactions. The process goes as follows: When a bank uses Ripple Payments with its CBDC transactions, the platform converts the amount into XRP and transfers it forward. The platform then converts XRP into the receiving currency and sends it to the receiving bank. This process goes through in couple of seconds, meaning the risk with conversion rates between currencies is non-existent. Meanwhile, banks' nostro and vostro accounts would become useless and by using XRP, also foreign exchange rates would be avoided (van Breda, 2023).

This is a great example of how traditional banks have started to leverage blockchain technology in their processes, in this case in designing and transacting CBDC's. Ripple, in turn, is constantly entering into new collaborations with different financial

institutions, and if their payment system goes to the use for which it is designed, it has the potential to one day be a significant player in the cross-border payment sector.

3.2.3 Case BlackRock

The world's largest asset manager, Blackrock, is a big promoter of blockchain technology in traditional finance and the entity that leads this change from traditional finance towards a more efficient and accessible financial environment. They have been in the headlines recently for two main reasons, first by filing for the first Bitcoin ETF with eventually launching it, and then by announcing their plans regarding the tokenization of real-world assets. We will go through this important news briefly next.

3.2.3.1 Bitcoin ETF

On June 2023, BlackRock filed for the application of a spot Bitcoin ETF's with the SEC. This happened because of the growing demand from institutional and retail investors for a regulated and secure way to invest in Bitcoin. With ETF's, the exposure to Bitcoin is possible without actually owning or managing the cryptocurrency. This was the first step in the coming launch of the ETF's, with other asset managers joining BlackRock in filing for it during the next months (Reuters.com, 2024).

On January 11th of 2024, BlackRock's and Fidelity's Bitcoin ETF's were among nine others released during that day. By making Bitcoin more available to a wider array of investors, these new ETFs bring credibility to the crypto market in the eyes of the public and thus the launching has the potential to be a very revolutionary event in the industry. Consequently, there was a rise in accessibility that led to a surge in the value of Bitcoin; its price reached an all-time high of $73,798 last month (Bloomberg.com, 2024).

According to the article on Bloomberg (2024), the iShares Bitcoin Trust of BlackRock Inc. has turned into the world's largest dedicated Bitcoin fund, accumulating almost $20 billion in total assets since being launched in America early this year. Bloomberg compiled data which indicates that as of June 2024, the ETF was in possession of $19.68 billion worth of Bitcoins, thereby overcoming Grayscale Bitcoin Trust which had $19.65 billion. The third placed fund under this category is Fidelity Investments' Bitcoin having a total of $11.1 billion worth of assets (Bloomberg.com, 2024). These huge inflows into these funds mean that many investors and institutions now believe bitcoin can be used as a long-term store of value for any portfolio or strategy going forward.

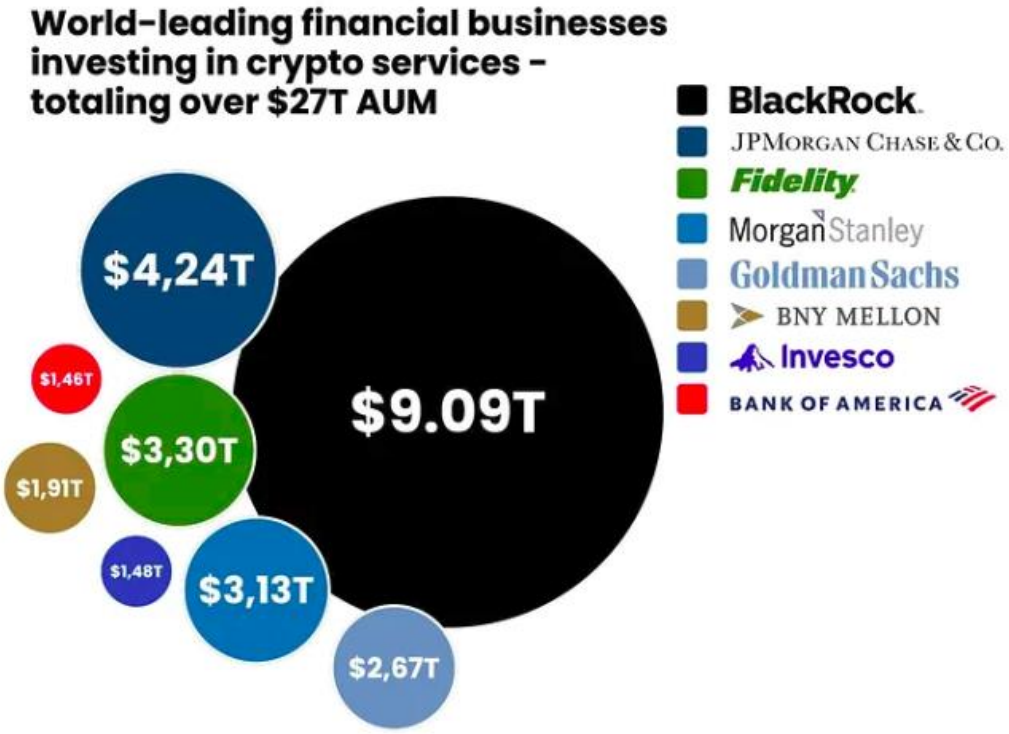

Image 6. Investing in crypto services by financial institutions (Medium.com, 2024).

3.2.3.2 RWA Tokenization

Real-world asset (RWA) tokenization is a form of digital transformation of various property rights, including bonds, equity, real estate and cultural properties in the

blockchain. The goal of this innovative approach is to improve liquidity, establish clear ownership and increase transparency, thereby making investments that were previously not accessible by public more available (Forbes.com, 2024).

In March 2024, BlackRock launched on the Ethereum blockchain its first fund implemented with tokens. Robert Mitchnick, Head of Digital Assets at BlackRock said "This represents an evolution of our digital assets strategy. In the digital assets space we are building solutions that solve genuine client problems and working together with Securitize." This partnership underlines technology as a driver for growth; hence BlackRock has heavily invested in tech companies and holds $10 trillion worth asset portfolio (Forbes.com, 2024).

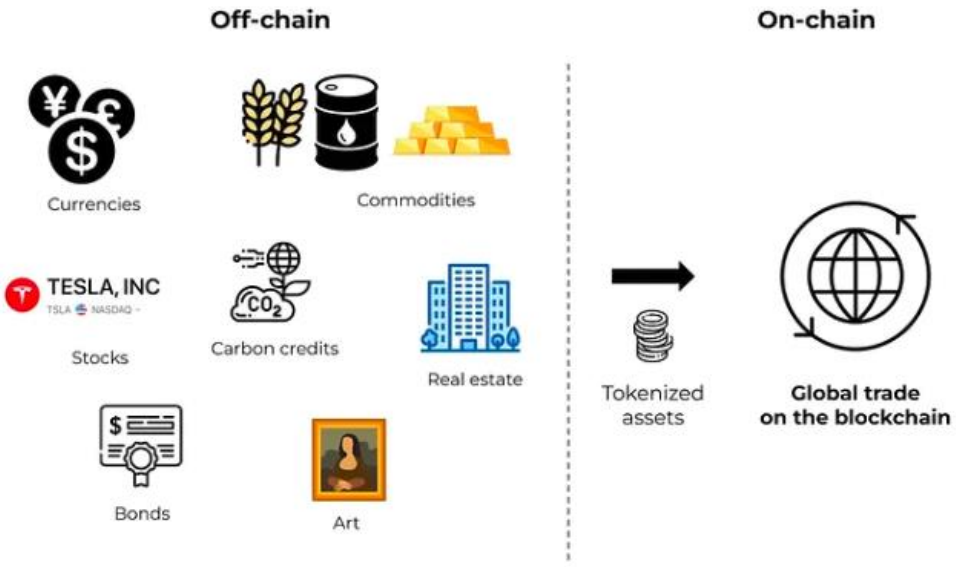

Image 7. Visual example of tokenizing real-world-assets (Medium.com, 2024).

According to the same article from Forbes, one example on how tokenization works is how the property investment opportunities will be revolutionized by real estate tokenization, especially with BlackRock managing about $39bn worth of real estate assets. This process means, simply put, converting property rights into digital tokens. In so doing, it aims at improving liquidity in the market and making property

investment more accessible to a wider range of investors. The strategy enables fractional ownership which means that an investor can own part of a property instead of having the whole asset. As a result, there is much more flexibility and fluidity in the investment, leading to opportunities for smaller investors while increasing the dynamism of the overall market. Therefore, through tokenization, real estate investing becomes open to all unlike before, but this also leads to significant implications on how properties are being acquired, disposed or managed, and thus eventually, potentially, changing the world of real estate industry.

4 DeFi challenges and shortcomings

In the previous sections, we have made it clear that DeFi enhances efficiency in the world of finance and lets programmers create new, innovative financial products and services extending possibilities of financial technology. DeFi can remove counterparty risk, but as always with new technologies they have some vulnerabilities. Those challenges must be faced and addressed if we want to provide a powerful and fault-tolerant system for new financial applications. In case there is no such mitigation, DeFi will be limited only as a trial technology making it impossible for it to be used more widely, or even become popular at all. There are several challenges that need to be solved in order for DeFi to truly break through, and we will tackle them next.

4.1 Security

In the past decade, hackers have often targeted crypto-based products, mostly exchanges in order to exploit the weaknesses of the system. Many of these incidents were due to poor security, but they highlighted one very important point: software is can be hacked and have developer errors. Even with blockchains eliminating some traditional financial issues such as counterparty risk, because in DeFi no middlemen are needed, it has brought new challenges as DeFi heavily relies on code which increases its attack surface unlike in other financial organizations. As mentioned before, public blockchains are systems that allow anyone to use the code, or the smart contract, once it’s deployed. Smart contract often governs native blockchain assets which leads to a new type of risk called smart contract risk (Campbell et al., 2024).

According to Amler et al. (2024), in DeFi, there are smart contracts that either directly or indirectly handle user funds. Attacker preferences naturally increase with the value of a smart contract. Thus, like any public bug bounty program where anyone who finds a bug can exploit it and steal the money locked inside; this is how smart contracts mostly work. For this reason, smart contract developers need to be careful to ensure

that their code does not have flaws. It is important to follow established templates and best practices, as well as perform extra security audits from third parties to get more assurance in the security of the smart contract. Developers can also write contracts that are able to receive security patches when they are already on blockchain. Nonetheless, there must be some kind of a governance structure in place for these functions, which may reduce decentralization levels, but increase security (Amler et al., 2024).

4.2 Information Asymmetry

There are areas within the DeFi ecosystem that lack transparency, especially regarding information that could affect people's decision-making. Often, the developers behind DApps remain anonymous, without users knowing anything about their expertise, honesty and experience on the field. Although white papers are usually released for new projects, there's no standardized way to compare these documents. That shows the need for regulatory clarity, and we'll go more deeply into that later on. Additionally, the information developers provide on their websites when promoting these projects usually does not match the actual product that buyers agree to purchase (Aquilina et al., 2024).

As Aquilani et al. (2024) state, this information imbalance is further complicated by the fact that sellers typically know more about their projects than buyers. A contradictory view to this is that when these projects are built on blockchain utilizing smart contracts, anyone can see the open code and the rules within the projects operates. However, a common issue in DeFi, and in crypto in general, is the "rug pull", where developers, after raising funds through token sales eventually abandons the project and vanishes investors' money. Because of the anonymous nature of DeFi, developers can escape easier compared to traditional finance without damaging their reputation. In traditional finance, consumers can pursue legal action against actual people, but in DeFi, consumers

only have a wallet identification number to go on, which makes it a lot harder and further emphasizes the need for some sort of accountability within the field.

4.3 The FTX Collapse

Perhaps the best way to describe some of the weaknesses of the crypto space and the entire DeFi environment is the infamous FTX case from the end of 2022. FTX, at that time the third-largest centralized exchange in the crypto market led by Sam Bankman-Fried, collapsed due to the misuse of its native FTT tokens, excessive leverage, and diversion of reserves. These factors led to a quick collapse of FTX in November 2022, and it not only impacted the exchange itself but also triggered a chain reaction throughout the crypto market (Fu et al., 2023).

What caused the collapse was a scoop buy news site CoinDesk revealing that most of the assets held by Alameda Research, a trading firm and sister company owned also by Sam Bankman-Fried, consisted of FTTs and other FTX-invented and controlled tokens, rather than a fiat currency or at least other a time-tested cryptocurrencies. Alameda Research was known for excessive leverage in their trading and the fact that FTX engaged in risky trading practices with high leverage ratios exposed the exchange to some significant risks. The scoop by CoinDesk led to customers pulling their money out of FTX, forcing it to quickly declare for bankruptcy and started a contemporary downfall for the whole industry (Investopedia.com, 2024).

The fall of FTX is a warning that the DeFi space needs to be regulated to prevent it from being exploited and protect investors. FTX's situation is a proof of what could happen when there is no regulation and control; the results can be bad and lead to an instability of the whole DeFi ecosystem. The risks involved in unregulated cryptocurrency practices were also shown by misuse of FTT tokens and too much leverage used in trading. Also, collapses like FTX's could have far-reaching effects because of interconnectivity of the DeFi ecosystem. Investors and users are not the only ones who will suffer if such a big

player goes down as companies and projects that operate in this space will also take massive hits. Without clear regulation coming to the space, it is very likely that the whole DeFi space will be prone to negative things such as different kinds of fraudulent activities and market manipulation. Therefore, regulatory clarity is vital for DeFi to reach the position is has the potential for (Fu et al., 2024).

4.4 Regulatory Challenges

Unlike in the traditional finance, crypto-economics regulation worldwide is not highly developed or uniform, and by doing that it would be possible to address the above challenges such as security and information. Also, as for DeFi, how the income generated is regulated remains largely unclear. The ecosystem does not have any clear legal position which enables using the system for illegal purposes, which of course should not be possible in a reliable economic environment. Nevertheless, at times it is hard to understand even if the ecosystem can face a shutdown as It is difficult to penalize certain users because of self-reliance and decentralized finalization of transactions. Governance needs to fill in the gap left by external regulation when it comes to DeFi (Amler et al., 2024).

Additionally, there are no know your customer (KYC) processes in place in DeFi ecosystems which hinders its acceptance by regulators as a formal financial realm. As for decentralization, KYC practices hardly matter anymore which means that regulators face a great challenge from stifling innovation too much while trying to regulate DeFi (Amler et al., 2024). All of this shows that even if there are a lot of good points to DeFi and it was developed specifically to promote the efficiency and accessibility of the economy, it still has a long way to go to be a reliable pillar in the economy and to establish the same status that traditional banking system has. By implementing regulations that are specific to the characteristics of the space the risks would decline, the space would be more transparent and market participants would be more accountable (Fu et al., 2024). It would also help establish standards for proper risk

management, financial reporting and investor protection, and thus foster a more secure and sustainable environment.

5 Conclusion

This study is a bit limited in a sense that not much academic research has been done on the topic as there is not much concrete utilization of blockchain technology as of yet. There is certainly a gap for future research as this is a topic that could be really massive in the future, and all signs point to that as well.

The blockchain-based financial ecosystem is a new phenomenon, and like any new and unproven technology with a big potential to be groundbreaking, it also comes with many weaknesses as well. Some elements of decentralized finance are more developed and advanced than others, but what is certain is that the use of blockchain technology has begun to be researched and promoted worldwide.

As throughout human history, the functions of the economy have constantly evolved, and this evolution will not stop here; we are constantly trying to find ways to be more and more efficient in the way we operate, and decentralized finance powered with the blockchain technology is the next step. The extent to which this can be exploited depends on the extent to which it is adopted as part of the economy and the extent to which its clear weaknesses are addressed. But one thing is certain, blockchain technology is here to stay and whoever knows how to use it best will be strong in the future.

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