DIGITAL TRANSFORMATION WITH DECENTRALISED FINANCE - LIBERATING FROM CeFi TO DeFi AND CeFi IN DeFi

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Introduction

Human beings in pre-civilisation era used to collect requirements for living life from mother earth that was freely available. There was no need for any sacrifice in exchange except hard labour and courage. Through the process of evolution came the era of barter. People exchanged one item against the other perhaps based on their own perceived value assessed in terms of hurdles to be overcome and efforts required for gathering from nature. Hundreds of centuries thereafter around 900 to 800 BC came the era of physical assets like land, animals, followed by cut-stones, cowrie shells, etc. used as the medium for exchange of goods for living.

Historians traced the convention of using coins in India from around first millennium BCE. Coin minting in India with different denominations started during the period of several ancient rulers of kingdoms, viz., Magadha, Ghandhara, Shakya, Surasena, Panchala, etc. during 600 BC. Those used to be exchanged by citizens as legal tenders. Historians could also find that Chinese and Lydian rulers of middle east region were two of the earliest introducers of coins. But existence of any centralised record for issuing, monitoring, and controlling circulation of such coins, or existence of any assets that back up total value of such coins could not be traced in any literature. Therefore, existence of the concept of centralised finance in that era could not be established. This needs more research.

Kaihua Qin et. al.[1] in their research paper mentioned about the first instance of *"…. centralised finance several thousand years ago"* practised during the ancient civilisation of Mesopotamia, situated in the valleys between Tigris and Euphrates rivers of West Asia. According to the findings of their research *"…. humans have used a wide range of goods and assets as currency such as cattle, land, or cowrie shells; precious metals such as gold …. and, more recently, fiat currencies. …. a currency can either carry intrinsic value or be given an imputed value …..*

Image Source:
https://beincrypto.com/top-five-defi-coins-for-december/.

All these were based on the premise of a centralized entity, where e.g., a government is backing the financial value of a currency. ..... History, however, has shown that currencies can also be valued using an imputed value, ... which can be unrelated to its intrinsic value, and, e.g., may even be zero". It is not clear what exactly was the year when centralised fiancé started. The authors have referred to present day fiat currencies whose imputed value is guaranteed, and circulation is controlled by respective central banks of each nation.

Objective

This article has been written keeping in view the single objective of bringing together the fundamental dimensions of decentralised financial services or DeFi. It will briefly narrate various aspects of DeFi so that readers can familiarise themselves with this relatively new development in the domain of digital transformation of financial services.

Centralised Finance or CeFi

The traditional knowledge about 'Centralised Finance' or CeFi, is built around the practice of financial systems in which all types of fiat currencies are issued controlled and monitored by a designated authority called the central bank which underpins the country's economy. This is done under the premise that the federal government has guaranteed payment of denominated values on presentation, irrespective of having or not backing of any intrinsic asset of equivalent value. The predominant objective is to create a stable currency that can function as a medium of exchange and a legal tender for settlement of transactions measured in monetary terms. CeFi thus has helped designing and administering other financial services using fiat currencies. Therefore, in CeFi, existence of a central authority is a must which reserves the right for censoring a transaction and issue all regulatory guidelines.

Citizens in such a CeFi ecosystem would have to first trust the governmental, its policies, and processes, the people at the helm of affairs and hierarchical levels of execution. Thus, in a CeFi ecosystem there are huge intervention of policy makers whose decisions are executed, and results are monitored and controlled through human interventions instead of being auto piloted by a technological platform embedded with smart contracts. The uses of such centralised systems must have to trust the authorities and agree with the terms and conditions of regulators and their authorised agencies like banks.

Decentralised Finance or DeFi

Genesis

In English alphabet D comes after C in order of literature or phonetic sense. Hence one can think of it being logically sequenced. But DeFI essentially emerged from the 'Black Swan' event of global financial crisis in 2008. It created a crisis of confidence on financial regulatory systems of developed nations. This event opened the vistas for innovators to think for decentralised finance riding on the benefits of digital technologies. The maxim says crisis is a good opportunity to waste. Satoshi Nakamoto's team grabbed the opportunity and published the paper on cryptocurrency. In 2009 they started the P2P network of private electronic cash or cryptocurrency called Bitcoin.[2]

The predominant objective behind this initiative was to liberate liquid assets of common people from the clutch of regulators of any country. This is touted to be the single most major reason that caused emergence of cryptocurrency. Execution of transactions using Bitcoin were facilitated by a blockchain technology-based platform in a trust less environment and without the control of any central agency. Every transaction is encrypted with complex algorithms, because of which such a currency is called cryptocurrency. This is the bedrock for DeFi.

Features of DeFi

DeFi is also known as non-custodial finance because in this ecosystem there is no central controller and intermediary. In this system there is no need for any human intervention Readers by now must have appreciated that all features of Blockchain technology are also synonymous and coexisting with the features of DeFi. The following is an illustrative list of features of a DeFi system:

- Decentralised,
- P2P Network,
- Permission less,
- Open to all equally
- Trust-less environment,
- Transparency and immutability,
- Encryption, safety, security, and privacy,
- Distributed data storage management systems,
- Embedded smart contracts performs as a compliance manager,
- Wallet at every participant's Node to be linked with ERP using APIs,
- Absence of intermediation, sanction, and censorship by any central authority,
- Interoperability that allows more than one platform to collaborate and work together

These features of DeFi enables anyone from anywhere to participate, interface, and deal with her/his assets independently without any intermediation and third-party custodianship. DeFi systems are developed also with facilities for composability. This allows assembly of other selected protocols in multiple combinations, which

enables a DeFi system to plug in products of other systems. All these features by themselves are indicators of the benefits of DeFi as a system for providing financial services by FinTech companies. Such a FinTech system is not devoid of risks and losses for users, particularly from the perspective of users' ignorance, gaps in knowledge and lack of training as have been detailed in a subsequent section.

Building Blocks of DeFi

DeFi as a system is designed, architected, and developed by applications of digital technologies. The following are the major three building blocks:

- Blockchain Technology: Readers may refer the author's articles as listed below at serial number 4 and 5 of Webliography to know more about this technology.
- Digital Assets These are crafted by digital tokens representing a value, the quantum of which may remain static or dynamic if driven by market forces. The author has written about such assets in this 'Digital Transformation Column' of June, 2022 issue of this Journal.
- Digital Wallets - The technical definition of a digital wallet denotes that software interface which enables a user to manage assets stored on a blockchain platform. For assets contained in such a non-custodial wallet, the user has exclusive control through her/his private keys. Private keys for a custodial wallet is managed by a service provider.

DeFi and DApps

The term DeFi is synonymous with decentralised applications, i. e., 'DApps' because DeFi services are rendered on a P2P network following the principles of distributed data storage management (DDSM). It allows each user to participate from her/his computing node. All transactions on a blockchain platform for DeFi are executed under the guardianship and scripted driving principles as enshrined in the digitally embedded smart contracts (SCs). These are supposed to be drafted legal eagles with due compliances of all related legal and regulatory requirements. Readers may please refer the author's other articles on Blockchain technology[4] and Smart Contracts[5] for more inputs on this.

Another reason for considering DeFi to be DApps is operation of the system without intermediation of any central agency like commercial banks that functions between the fund provider and the borrower. The common belief is that the intermediaries, viz., banks and financial institutions, that dealt with sub-prime mortgages with the gluttony-driven objectives of multiplying profits, are predominantly responsible for the global crisis of 2008. In a DeFi ecosystem there is no place for any intermediary. Its blockchain based platform does not give anybody any right of censoring and interfering into any transaction.

Financial Services through DeFi

According to a publication of Wharton University press of May 2021[3], *Decentralized Finance (DeFi) is a developing area at the intersection of blockchain, digital assets, and financial services. DeFi protocols seek to disintermediate finance through both familiar and new service arrangements. ….. DeFi is a general term covering a variety of activities and business relationships. … While traditional finance relies on intermediaries to manage and process financial services, DeFi operates in a decentralized environment—public, permissionless blockchains. Services are generally encoded in open-source software protocols and smart contracts."* This paper identified six broad groups of financial services through DeFi mode. The first one is Stablecoins which are essentially cryptocurrencies designed to have stable exchange rate because of being pegged with a currency or a commodity and their supplies being controlled by algorithms.

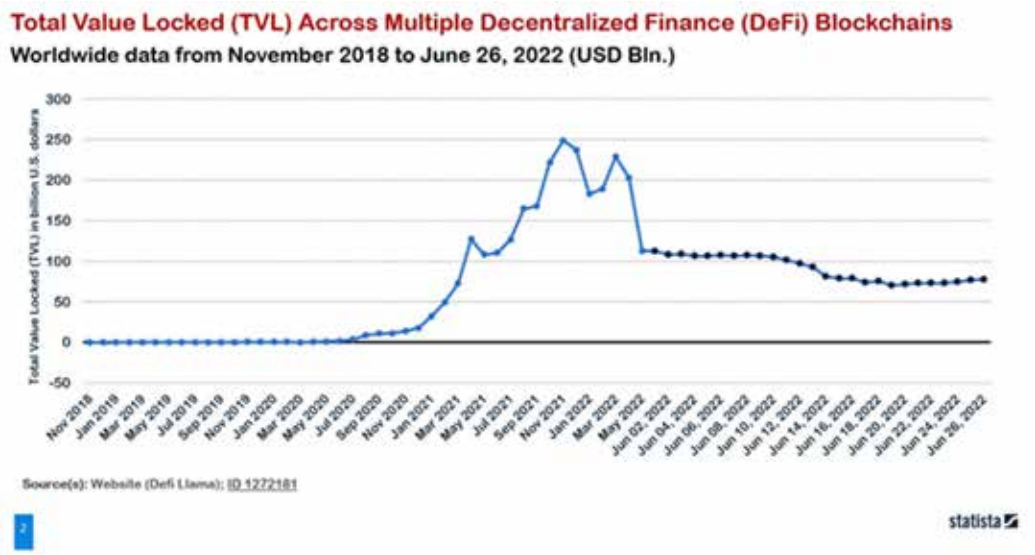
Source: https://vulcanpost.com/738088/what-makes-stablecoins-different-from-bitcoin-and-other-cryptocurrencies/

However, major contraction in values of Stablecoins said to be a sympathetic reaction of huge landslide in values of major cryptocurrencies in recent past. The big question that has arisen whether they can at all be considered as stable! The other services by way of DeFi rendered by FinTech companies are that of an exchange for cryptocurrencies, credit delivery for borrowings by others, trading on derivatives, insurance, and asset management, earning interests etc. Consequently, DeFi can be considered as an overarching term for financial services which banks can render. The extended ones are secondary services for digital wallets and DApps for conducting transactions. Lex Sokolin, Global Fintech Co-Head of ConsenSys said, *"We are a stone's throw away from the global financial industry running on a common software infrastructure."*

Volume of DeFI Services

Financial services through DeFi gained reckonable momentum from around 2018 although Bitcoin was introduced in 2009. Within a short time span it has become a worldwide phenomenon. It would be worthwhile now to know more about the major DeFi service, i.e,, lending. Statista reported[6] that *"The total value locked (TVL) in decentralized crypto lending platform Anchor Protocol grew by roughly 50 percent within a month in 2022. The lending protocol was created within the Terra blockchain and launched in March 2021, first meant to support the demand for stablecoin TerraUSD (UST). One year later, it had already become one of the biggest DeFi platforms based on market cap This popularity stems from the platform's promise to hand out a stable interest rate of nearly 20 percent for those looking to stake cryptocurrencies - a percentage described by some as "a benchmark yield for the whole industry*".

However, globally the volume of DeFi services is influenced by the market dynamics affecting prices of cryptocurrencies. As per the following information of Statista, globally DeFi operations touched USD 250 Billion mark sometime in November 2021.



Source: https://ezproxy.svkm.ac.in:2307/statistics/1272181/defi-tvl-in-multiple-blockchains/

However, the market size was significantly affected when value of Stablecoin like TerraUSD (UST) crashed in May 2022. Since then, uncertainty is prevailing in global cryptocurrency market and many Stablecoins lost their peg to USD. The above graph ends on June 26, 2022, when the price of Bitcoin was USD 21,481.64. Therefore, one can infer that volume of DeFi services is dependent on the price of Bitcoin which also influences prices of Stablecoins. Such volume will further deplete because as this article is being written value per bitcoin has reduced by 71.44% to USD 19,291.66 at GMT 5.30 on July 4 2021 from its peak of USD 67,553.95 at GMT on November 9, 2021.

CeFi In DeFi – Picture in Picture

Some of the FinTech companies (FTCo.) providing DeFi services, can also perform as a CeFi service provider using extended digital applications. The following is an illustrative list of such services:

- A customer, having a wallet for her/his cryptocurrency investments in say bitcoin at the FTCo's exchange, can offer a part of that as a collateral and take loan in fiat currency at a specific interest rate. Alternatively, the loan can be also extended in cryptocurrency itself,
- Intermediary services for P2P lending between two wallet holders for cryptocurrency in the FTCo's exchange for

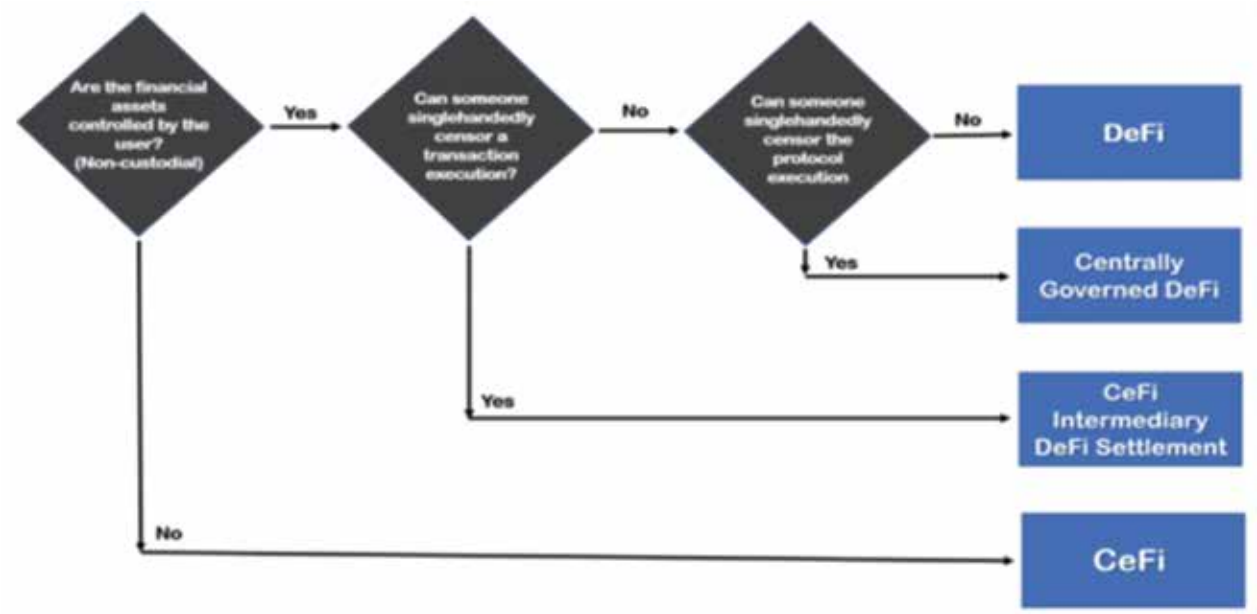
which the transaction can happen in cryptocurrency,

- Facilities for trading on derivatives by the FTCo's investor community with cryptocurrencies as underlying assets, and
- Insurance service provider to cover risks against loss of funds in wallets or wrong transfer of funds to an unintended wallet against premium to be paid in cryptocurrency or fiat currency. This service protects interest/financial loss of users from risk exposures as detailed in a subsequent section.

Comparison of CeFi Vs. DeFi

The most prevalent distinguishing features between CeFi and DeFi are around the following questions:

- Who controls the assets,
- How transparent and accountable is the system, and
- What privacy protections exist for the end user?



Source: Recreated by the author from the image at https://arxiv.org/pdf/2106.08157.pdf

As is apparent from the above decision tree `the conditions to be satisfied for determining the status of financial services provided by a FinTech company can be determined in the following manner:

- DeFi: Financial assets are to be controlled by the user without any one of the systems reserving any right to censor both protocol for execution and actual execution of transaction.
- Centrally governed DeFI: It is equivalent to DeFi except for someone operating the system has the right to censor the protocol for execution.
- CeFi Intermediary and DeFi Settlement: Custodial control of the asset is executed by the owner user, but the FinTech entity has the right to censor both execution of transaction and the protocol for the same.
- CeFI: The user is not the custodian of the asset and some player in the service system can reserve the right to censor execution and protocol for execution.

Risks Exposures for DeFi Users

Users of any DeFi system are exposed to several risks, the most common of which could be listed in the following lines:

- Intrinsic Risks: These risks may creep in when the Smart Contracts are crafted for embedding into the operating system of Blockchain platform through which DeFi services are rendered.
- Exogenous Risks: These risks may get built in the DeFi system when external protocols for other financial operations like lending, trading on derivative, insurance services, etc. are stitched into the smart contracts for DeFi.
- Governance Risks: DeFi services are operated in a decentralised environment due to the inherent nature of blockchain technology. In the absence of globally agreed regulations and code of standards so far, there are

scopes for the operators to influence the governance procedure while embedding operating protocols into the smart contracts taking advantage of users' ignorance.

- Market Risks: Volume, costs and returns from DeFi systems are largely dependent on cryptocurrency market which in turn is also influenced by traditional factors that affects external financial markets. This has more been explained above under the section 'Volume of DeFi Services'

Need for Regulations

The author in many earlier articles under this Column has reinforced the need for global demands for introduction of regulations by multilateral agencies like IMF, World Bank and BIS for private cryptocurrencies. The need for introducing a code of standards for this, like IFRS for accounting and reporting and aviation standards for flying aircrafts, need not be debated anymore. This is a must because there are reported nefarious activities like money laundering, funding terrorists, extortions by cybercriminals, and several other financial crimes being committed using cryptocurrencies. Worldwide proliferation of DeFi has further intensified the challenges of regulating cryptocurrencies. Therefore, meeting such institutional responsibilities under the garb that greedy investors are playing with cryptocurrencies cannot and should not be sighed away anymore.

One school of thought is of the view that the 'Recommendation 16' of the Financial Action Task Force (FATF) can help meeting these challenges. Because it can be applied at the intersection point of mainstream finance with cryptocurrency exchange and wallet service providers. Those exchanges convert fiat currency to cryptocurrency and vice versa.

One good news is recent introduction of the Lummis-Gillibrand Bill in the USA which is intended to serve as a regulatory framework for **digital assets, including cryptocurrencies**. It has been welcomed as a positive step, but consistency and cooperation between global regulators will be needed to achieve effective regulation and supervision of this space. Forbes' post[7] on the above inter alia include the following views - *"There are many discussions about how regulators can talk through common goals and stay aligned. There has to be some element of coordination globally and shared principles, but we will continue to see distinctions between jurisdictions on how they regulate this market."*

While the USA has put the first step forward, the foremost requirement is to form a global forum of multilateral agencies with participation of all major nations. This task group must single-mindedly focus only on cryptocurrencies and DeFi. The major objective should be to come out with a globally accepted regulation and code of standards. Each nation may be allowed to moderate their relevant acts and regulations to meet the unique requirements of their country's financial and regulatory ecosystem.

Conclusion

DeFi as a subject is evolving and gaining momentum in terms of the idea being tried out by many FinTech operators across nations. They will continue to do so because people have understood the benefits of adopting digital technologies for transforming various aspects of a common man's daily life. However, hurdles are being met as the system is heavily dependent on cryptocurrencies. Innovative design thinking and application orientation may bring in DeFi based operating solutions with adoption of CBDCs. Till that is done, the author would consider this work to have met its bit of purpose if people in general get a fundamental view on what DeFi is all about. MA

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All these websites have been accessed during June and the first week of July 2022.

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