

Tudományos Diákköri Dolgozat:

Smart contracts as tokenized investment funds – A Technological Analysis of
the Enzyme Finance On-chain Asset Management Platform

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Abstract

This paper investigates the use of blockchain technology as an asset management platform through the company analysis of Enzyme Finance, the oldest and most established actor in the field. Blockchain technology has been in popular culture for some time now, but it is mostly associated with commodity like trading and certification of digital art, despite the fact that the more advanced cryptographic solutions, smart contracts can be utilized in many different sectors, and as the vehicle of the Decentralized Finance (DeFi) movement it has penetrated the financial world. With the increasing influence and selective entrance of the asset management world, the aim of this paper is to highlight and summarize how the example on-chain asset management firm, Enzyme Finance operates, what benefits and drawbacks does it have compared to traditional asset managing companies, and how future development in blockchain technology can solve existing issues in the DeFi space.

1. Introduction

1.1. Importance of the topic, research questions

From the inception of the blockchain, the usage of the technology has rapidly evolved and entered several industries. As of today, chaining together blocks of data are transforming industries such as transportation, administrative verification, legal services, and art to name a few (Zile & Strazdina, 2018). In the financial world, the decentralized finance movement (DeFi) has been prevalent since the creation of Bitcoin, and with more sophisticated protocols following Nakamoto's original idea, such as the Ethereum blockchain, it was able to mimic all fundamental financial activities. These actions include money market creation by lending and borrowing, trading financial instruments, designing derivatives, and managing crypto assets. However, amid the eruption of popularity regarding other utilization of cryptography, referring to the trade of coins as financial commodities and validating scarcity of digital objects as NFTs (non-fungible tokens), DeFi has not been covered thoroughly and its use cases does not mean much to most people outside of the blockchain community, but either in tech-savvy groups. This is especially the case for complex projects, such as derivative creation and management of digital commodities, which are even more staggering in contrast to how important these industries are in their traditional, institutionalized realization.

Asset management's role in the global economy is decorated one. The worldwide market for managing assets has amounted for \$103 trillion (The Boston Consulting Group, 2021),

making it one of the biggest industries in the whole world. However, the creation, management, and investing opportunities in the asset fund environment is a gated and limited one. As an investor, higher than usual starting capital is required to join a mutual fund, and to run and create an own one as a manager, it does not only need immense seeding capital, but also prolonged legal processes and heavy reliance of personal networks are involved. It is a cumbersome process, that does not pay off in the end many times. However, with the democratization of capital through web 3.0 solutions, creating mutual funds or similar financial applications are possible via on-chain asset management funds.

This lack of coverage of decentralized finance combined with the emphasized role and potential democratization of the asset management industry, the aim of this research is to shed a light on:

How blockchain technology is used for managing assets?

Why are on-chain asset management firms better and worse compared to institutionalized management?

How can future development of the crypto space and the evolution of the subject company eliminate the drawbacks explored in this paper?

1.2. Aim of the thesis work

The goal of the study is to summarize and interpret how blockchain technology can be used to replace traditional asset management activities via the general and technological analysis of Enzyme Finance, the oldest and most popular on-chain asset management platform. The investigation will include literature about the asset management industry, blockchain technology, focusing more on smart contracts, then concluding with the examination of Ethereum and the DeFi movement. As the practical element, the paper will introduce the Enzyme Finance platform, by exploring who can use it, for what purposes can it be used, why is it a unique offering in the on-chain asset management space, what advantages and disadvantages does it hold against traditional asset management firms, and ending the study by responding to how currently prevalent issues can be resolved in the future.

2. Literature review

2.1. Asset management

The management of assets is a large industry. As of 2020, open-ended asset management funds were responsible for a net total of \$103 trillion (The Boston Consulting Group, 2021). However, not all asset managing investment funds operate in the exact same way. We can distinguish between mutual funds, exchange traded funds, hedge funds, private equity funds, and venture capital funds (Morley, 2014). To keep the focus of this study, mutual funds and exchange traded funds will be discussed in further detail. These are the two open-ended fund types, which will be relevant in later sections of this paper.

Mutual funds are by far the most widespread iteration of shared common pools of financial assets. These funds offer their accumulated instruments, such as stocks, bonds, derivatives, commodities, and other types of investible products to the public. The main characteristic of such asset managers is that shareholders can return their assets any time to the fund in exchange for cash, equivalent to the redeemed asset. Exchange traded funds (or ETFs in short) are special kinds of mutual funds, where people can also purchase fractional shares of a composite stock that derives from a portfolio of assets. The most famous ETFs are the S&P500, Nasdaq100 and the Dow Jones composite indexes, but in the modern financial world ETFs, due to their fractional ownership attribute, are increasingly popular and currently many thousands of them exists, characterized by what industry or country does their portfolio of stocks cover. These funds are open-ended, meaning that the number of shares offered by them are not limited, and controlled by market forces. Due to this on-demand nature, these are the most accessible funds to the public.

However, these funds have their limitations. Mutual funds and ETFs are not customizable investing possibilities. They provide a wide range of portfolios and investment strategies, but the possibilities are limited, and the investor is exposed to the funds management regarding investment strategies and ESG susceptibility. In-short, the customer is not in control of its own investment and cannot trust mutual fund managers with personal requests and strategies either. Additionally, the bureaucracy surrounding these institutions are massive. They have to comply with the rules of many regulatory bodies and their operations are under strict observation. As consequence, many drawbacks of this strict system trickles down to the consumers in the form of excessive information requirements and operational fees. As a result, many of these institutions have a lower limit of profitable scale. In short, mutual funds and ETFs are not catering towards the satisfaction of individual customers and can generate

the sense of exploitation with questionable business strategies, disproportionate operating fees, and overbearing informational requests. As such, these investing opportunities are highly impersonal, centralized, and undemocratic.

As a response, many actors in the asset management space have started to look for alternative ways to get around this rigorous machine. And as it happened before with many other industries in the past, the next step in the asset management industry's evolution has come with the development of the Internet, by the innovation of web 3.0: blockchain technology.

2.2. Blockchain technology

Blockchain technology was first implemented in 2008 with the introduction of Bitcoin. The conceptual idea behind the first cryptocurrency was that e-commerce had been almost exclusively reliant on financial institutions (Nakamoto, 2008), and there was no alternative peer-to peer paying method on the internet, similar to physical transfer of money in the form of cash. As this trust-based model had become the norm of internet commerce, it maintained the weaknesses of such systems: the impossibility of completely non-reversible payments, the cost of mediation forced a lower-limit on transaction sizes, as the economical utility of small transactions diminishes quickly, and the further costs of establishing trust between customers and merchants, due to the impossibility of non-reversible pay, as the opportunity of fraud in a trust-based systems cannot be eliminated, nudging customers to be overbearingly cautious with online vendors.

To root out the issues of trust centered models, Nakamoto (2008) has proposed an “electronic payment system based on cryptographic proof instead of trust”, which is the main principle under Bitcoin, and all cryptocurrencies that has appeared since. In this system, users can transfer money directly without the need for an institutional intermediary, as the trust is replaced by a long computation that is needed to be solved and then accepted by all nodes consisting in the network of computers acting as decentralized infrastructure of the blockchain. To ensure trust in the system, Bitcoin has several mechanisms that makes the chain trustworthy even without one central entity.

First, payees need to know that the owner of financial coins did not initiate other transactions before. As an accountability tool, all financial transactions are publicly announced on the system, and all parties of the network has to agree on a common, single history of transactions. But for this to work, the payee needs proof of claim and the majority of nodes building up the system has to agree on it. This leads to the second characteristics of Bitcoin,

which is a timestamp server. With this implementation all hashes have a timestamp, which assures that the data has existed at a certain point of time. By combining these two characteristics we get the essential part of all blockchain protocols, the publicly distributed ledger of the system. Additionally, all hashes include the timestamp of the previous hash, further reinforcing the data in the past by forming an ever-growing chain. The third characteristic of the technology is the implementation of timestamps via proof-of-work. The proof-of-work mechanism serves two purposes: for one, it is the vehicle of implementing a time validity system. This is achieved by solving a complex calculation involving as many timestamps as possible, creating the longest chain in the network. Once it is solved, usually by the CPU that expended the most power (hence, creating the longest chain), the work has to be checked by many nodes in the system. After this public inspection concludes, the new block is solidified and added to the previously validated blocks of data. This is an important security feature of the blockchain technology, as these blocks cannot be altered, only if all previous elements in the chain have been altered as well. The computational power needed to crack the system are so immense that virtually it can be deemed as an impossible task. And for second, proof-of-work establishes representation in the system as one-CPU-one-vote (Nakamoto, 2008). It abolishes a one-IP-address-one-vote system, that could more easily undermine the democratic decentralized nature of the network, as it is more vulnerable to a 51% attack.

Based on these concepts, the whole process of block creation can be summarized by the following six steps:

- 1) New transactions are broadcasted to all nodes.
- 2) Each node collects new transactions into a block.
- 3) Each node works on finding a difficult proof-of-work for its block.
- 4) When a node finds a proof-of-work, it broadcasts the block to all nodes.
- 5) Nodes accept the block only if all transactions in it are valid and not already spent.
- 6) Nodes express their acceptance of the block by working on creating the next block in the chain, using the hash of the accepted block as the previous hash.

By understanding how Bitcoin, the first real usage of blockchain technology works, it is much easier to see why the innovation holds so much power and value. As mentioned before, Bitcoin and – consequently – blockchain technology has appeared to provide a peer-to-peer method of interaction on the internet without the use intermediary institutions, only providing

value by being trustworthy. Instead, the validity of such systems is in the transparent, democratic, and decentralized way of functioning, with no restrictions on providing information to potential users. Based on the example of Bitcoin, all blockchain applications have their underlying principles and coding environment shared in the form of a whitepaper, allowing virtually everyone to look and understand how a specific utilization works. Furthermore, it provides as good basis for other aspiring thinkers and programmers to interpret these technologies in new situations and find new use cases for blockchain technology to innovate interactions on the internet. And as we will see from the following chapters, since 2008, there has been numerous new innovations, that has shaped the blockchain technology to serve as infrastructure for more sophisticated applications.

2.3. Smart contracts

The idea of smart contracts originates from Nick Szabo (1997). He identified this type of agreements as self-executing digital codes that can be attached to all sorts of property, and the participant in the commitment can be anyone in possession of a transactional asset, holding value in the system that includes the contract. The simplest example of such covenant is the vending machine (Szabo, 1997). As a rundown of the process, an individual goes to the machine, selects the item they want to purchase, insert coins that are validated by the dispenser, and in return the individual will either get back the item they have selected and change if the provided financial resource exceeded the price, or if the amount or denomination of coins were not right, the machine will provide back the inserted money. In this situation the soda dispenser is the bearer of the contract, that autonomously allows anyone with the right amount and right currency of coins to participate in the purchase with the merchant and execute the transaction without any further external interaction (Szabo, 1997). This is an easy example to understand how smart contracts can operate. However, as the author mentions it as well, the potential usages of such covenants in the digital space are much more sophisticated and nuanced.

The creation of smart contracts has several steps. First, the settlement needs to have a property attached to it, covering the subject of the agreement. Second, the contract is running on a set of code that contains as many as required if-then-else conditions. It is the essence of the self-executing nature of this solution. And thirdly, in the application it is also assessed how the conditions must be met, in what form of asset (which we will see later is more often than not some sort of token or coin).

Smart contracts are valuable tools for several reasons. Deriving from the nature of the contract, it is much more of a code rather than a traditional agreement. It means that once it has been written, it is certain how it will behave, and what form of payment it will require. Furthermore, it does not need an independent authority to enforce the clauses on each party represented in the paper, as the code will do it by itself, continuously and instantly, eliminating any mismatches of power between the participants. And last, it creates an open agreement structure in which everyone can participate who have the capability of acquiring the assets needed to enter the program, unlocking the door for easy accountability regarding properties entailing public contracts.

With this concept explained however, it is not inherently clear how smart contracts are part of the blockchain world. The connection is through the automated, self-executed nature of smart contracts, and the decentralized attribute of blockchain technology. When the concept of smart contracts was realized, it was clear to see that the automation must happen via code. But it was not clear how to make them self-executable, because in web 1.0 and web 2.0 the altering of data happened by centralized entities. However, as it was discussed in chapter 2.2., the biggest yield of web 3.0 is the true democratization of content on the internet. Thus, it enables the creation of digital smart contracts, that satisfy all characteristics described in the concept paper (Szabo, 1997).

Even though blockchain and smart contracts make a perfect pair for each other, not all protocol deal with the creation of such solutions. Furthermore, many of the implementation that can make a good infrastructure for smart contracts are not popular and mature enough to be a reliant environment for them. However, in recent years, one platform has emerged as the best operating system for creating these sophisticated applications and has quickly risen to be the second biggest blockchain protocol in the world: Ethereum.

2.4. Ethereum

2.4.1. Concept of Ethereum

Ethereum is the most widely used blockchain protocol utilized to build various decentralized applications (Buterin, 2014). The infrastructure of Ethereum has come to realization amid the several emerging use cases of blockchain technology, paired with the lack of general tools available to carry out these ideas' implementation. Buterin, the founder of Ethereum saw that the blockchain technology fundamentals created by Nakamoto such as the proof-of-work principle can be used in other contexts as well, such as creating new currencies, digital tokens,

smart properties (or in other word, Non-Fungible Tokens), and smart contracts (Szabo, 1997). However, Script, the coding language of Bitcoin was only good for a state of transition system, signaling that at one point of time who controlled how many assets on the blockchain. But it could not be used for any other previously mentioned applications. In contrast to Script, Ethereum has two properties, that enables it to be suitable to carry out these more sophisticated applications: the Solidity programming language and the possibility of creating ERC-20 Tokens.

2.4.2. Solidity language

The programming language of Ethereum is called Solidity. It is a Turing-complete programming language, that allows anyone to write smart contracts and decentralized applications with their own arbitrary rules for ownership, transaction formats and state transition functions (Buterin, 2014). Turing completeness means that Solidity can recognize or opt other rule sets of data-manipulation. In this space, the programmers can create two types of accounts: externally owned accounts, which are managed by unique private keys, and contract accounts, which are managed by its contract code. These different accounts can mutually interact with each other, but derived from the unique characteristics of the two, externally owned accounts act as a storage for an entity's crypto assets, while contract accounts act as autonomous agents on the blockchain, fulfilling their purposes on the system. These codes running under the contracts which are being executed every time a new block has been added to the chain on Ethereum based on the interactions it had conducted during that period. The list of potential interactions on the system is ever-growing as more and more people use the platform, and with regular updates to the coding language, it has a vast library of applications that can be coded with internalized code lines (Wood, 2014).

Resulting from the robust coding infrastructure, Ethereum has many different use cases, most notably creating financial derivatives and Stable-Value Currencies, Decentralized Autonomous Organizations (DAOs), and Token Systems. The latter is a very important aspect for various financial applications in the crypto space, which will be further elaborated on in this study.

2.4.3. ERC-20 Tokens

The other useful characteristics of Ethereum is the ability to create standardized, fungible tokens that can be attached to any type of smart contract. The ERC-20 tokens can represent many properties on the chain, such as lottery tickets, financial assets, fiat currency, or any

other financial instrument. In this standard, all tokens representing the exact same property are equal with each other, and equal to the market determined price of them denoted in Ether, the principal internal crypto-fuel of Ethereum, what is used to pay transaction fees on the Ethereum blockchain (Buterin, 2014). The extent of how many tokens are available and where the tokens can be stored and reallocated or transferred is all determined by the smart contract they are attached to. These properties combined, the potential tokenization of smart contracts with economic dynamics make the Ethereum blockchain a potent infrastructure to create public resource pools, for example mutual funds.

2.4.4. Why Ethereum is most suitable for creating smart contracts?

Combining the previous findings about Ethereum, we can see why the platform is such a powerful infrastructure to build smart contracts. Rooting from its Turing-completeness and more versatile toolset, the programming environment is way more suitable to create sophisticated, multiple clause contracts, which are behaving as autonomous agents on the network according to their functioning program code. Additionally, the ability to join to smart contracts are entirely up to the creator of the agreement, making them private if needed be or open for public use cases. The ERC-20 standard enables the fractionalization of the commitments with equal representation per tokens, and market-driven exchange rates for Ether, that not only makes smart contracts fairly accessible (as the creation of Ether wallets are not so difficult) but also qualifies them to act as financial instruments if needed be, or bars them to act as such. Thus, the Ethereum environment has all the toolset to make private and public smart contracts in the way they were intended to be created (Szabo, 1997).

Consequently, Ethereum based smart contracts has spread across multiple industries. In recent years, one of the biggest transformations has begun in the biggest industry in the world: the financial services industry. Because of the sheer size and complexity of the sector, the different blockchain applications are mimicking just a few processes present in the finance world. The collective name of this movement is called Decentralized Finance, or DeFi in short (Schar, 2021).

2.5. Decentralized Finance (DeFi)

2.5.1. Definition of DeFi

Decentralized finance is “a blockchain-based financial infrastructure” (Schar, 2021). All DeFi protocols share the same characteristics of being open-source platforms running on some sort of blockchain technology, that can be accessed without any permission. DeFi with its

democratic and decentralized way of operation replicates all financial activities without the shortcomings of traditional finance. These processes include sending payments, lending, borrowing, trading, derivative creation, acting as market information processing oracles, and wealth management among others.

Keeping the substituting activities in mind, we can see that the protocols must be sophisticated to replicate all functions. As Bitcoin was the first blockchain application, and it had a financial focus, it is accepted to look at Nakamoto's application as the first DeFi project. However, due to the simplicity of the underlying programming language, Bitcoin is only usable for money transferring, but not much else. This is where Ethereum, and the possibility of creating smart contracts comes in. On Buterin's platform, the sophisticated coding allows developers to create financial agreements in the form of smart contracts. These financial instruments are specified by the account's contract code. Combined this fact with the robust ecosystem of tools, all financial activities on Ethereum can be replicated. Furthermore, the ERC-20 token standard allows users to exchange their Ether crypto assets to any token that represents a smart contract on the blockchain, making these tokens a symbol of fractional parts of a common resource pool, which can be in the form of an investment fund, a trading platform, or lending environment.

2.5.2. Underlying technologies and value added compared to traditional finance

As previously mentioned, the core of all DeFi applications are smart contracts. These self-executing codes can either act as autonomous agents, imitating lending allocations, serving as derivatives of a connected financial instrument, trading processes, or asset managing mechanisms; or they can be legal obligations to a trustee, that is handling the assets pooled into the smart contracts account. Either way, the rules and regulations imposed on the financial actor is in a form of code, that can be seen and verified by anyone interacting with the agreement. With this implementation, users of financial services can directly handle the contract unlike in traditional financial services, where people have to trust a third-party institution to handle the operations.

From this paradigm shift from indirect to direct interconnectedness, DeFi can provide many added values beyond traditional solutions. Deriving from the open and permissionless nature, these applications can reach larger audiences and can offer services for unbanked and underbanked individuals, while also create bigger pool for investment funds. With the elimination of middlemen, people can send transactions faster, and platforms provide greater

freedom of financial mobility. Furthermore, these transactions are not only faster, but programmable as well, creating infinite number of possible use cases for DeFi, that can be even made custom made for every end user of these services.

2.5.3. Use cases

Reflecting on the previous parts of this paper, DeFi has a wide range of possible uses. As the decentralized financial world is a rather new one, and innovations can happen rapidly and continuously, this paper will elaborate on applications that are widely used as of now in the community, and several bigger firms can be mentioned as examples. After that, the attention will turn toward the main subject of this paper, on-chain asset management, and introduce the concept in even more detail than other applications.

Lending and borrowing

Lending and borrowing are really important elements of a financial system, as they are the key building blocks of wealth mobility and wealth reallocation. In the DeFi ecosystem there are many different iterations of lending protocols exists with different underlying mechanisms. The only shared characteristic is that all solutions do require the identity of neither the borrower nor the lender. In this way no one needs to identify themselves, making all platforms completely open and permissionless.

Differentiating between the platforms by mechanisms, we can distinguish between two main categories: atomically repaid loan and collaterally secured loans. The first iteration means that “the borrower receives the funds, uses, and repays them - all within the same blockchain transaction” (Schar, 2021). The later implementation is self-explanatory, but it has three different sub-sets. Platforms like MakerDAO (Brennecke, et. al., 2022) allows users to create collateralized debt positions with their existing crypto assets, and in return they can withdraw a predetermined maximum amount of assets attached to the platform in return. On the other hand, Compound and Aave, the two other prominent lending platform in the DeFi environment managing loans through collateralized debt markets (Schar, 2021). In these implementations, the collateral does not create new tokens on the chain, but borrowing tokens from another person, storing their assets on the same platform. Debt markets can have two potential implementations, as a peer-to-peer matching of assets by connecting potential borrowers with potential lenders, or as a pooled market, where supply and demand will determine the rates applicable for the loans. In these systems as well, the borrower needs to put in collateral to ask the loan.

Decentralized Exchanges (DEX)

As in the past couple of years the interest toward crypto assets has risen dramatically, it is a logical step that cryptographic blockchains have decentralized exchanges (DEX) running on them. However, in many instances blockchain coins have been traded on sites that are centralized, meaning that traders had to deposit their assets first. And as a unique selling point of crypto assets being decentralized, the two notions were in contradiction with each other. This sparked the creation of DEX protocols. In these platforms, traders do not need to trust the trading environment with their financial instruments before the trade has been initiated. The business on DEXs happen atomically through a smart contract (Schar, 2021). In addition to the atomical carry-out of the transaction, the smart contract responsible for the trade can provide additional services if needed, making any centralized exchange's services obsolete.

The most well-known DEXs that run on the previously explained Ethereum are Uniswap and Sushiswap. Both exchanges are automated market makers (AMM), providing trading services via smart contracts and liquidity pools. The automated market making happens in several steps. First, the liquidity pools are being created by one individual providing any two types of crypto assets into a pool. The ratio between the assets provided will determine the exchange rate of the two tokens. After the rate being set, the pool is being controlled by a smart contract algorithm that prevents the depletion of the liquidity pool by making the trades only available, if one asset of the liquidity pool is being exchanged to the other asset in the liquidity pool at the previously set exchange rate. Thus, the pools of assets do not need a market maker to provide liquidity to the trading all the time, as the Ethereum infrastructure's relative slow speed would make the market makers presence damaging to the overall user experience.

Derivatives

Decentralized derivatives, similar to their centralized counterparts, are deriving their value from an attached asset's financial performance, an events result, or any other observable dissimilarity of a variable (Schar, 2021). These instruments usually require an oracle, where traders can track the underlying object.

Derivatives can be categorized into two sets: asset-based derivative tokens, and event-based derivative tokens. The first type act similarly to collateralized debt positions, as the locked assets can be used to create synthetic coins that follows the value of its underlying asset. The most well-known site on the Ethereum chain that provides such services is Synthetix. Event-based tokens however mostly act as an open betting situation. First, the event being betted on

enters a smart contract, in which the code includes all potential outcomes of it. After this, people can bet on these outcomes by buying the synthetic coins representing their desired outcome. After the event has occurred, the smart contract allocates the funds pooled into it according to the betting rules. If no clear winner can be decided, all funds are returned to the original owner. The most popular decentralized betting site is Augur. It does not only use sophisticated smart contracts, but also pulls data from various sources, verifying the outcome from several directions.

2.6. On-chain Asset Management

2.6.1. Definition

On-chain asset management firms serve the same purpose as traditional mutual funds. Investors can put their financial resources into baskets of (crypto) assets to diversify their portfolios. However, the fundamental difference between the two is that the investing strategies and operations are not managed by an institutional body, but by a smart contract. Rooting from this development, investors do not need to trust a custodian with their assets to be managed but buying into funds in exchange for token funds can be done directly, without the need to give the cryptocurrencies for a moment. Additionally, the users of such funds (Schar, 2021): “can withdraw or liquidate them and can observe the smart contracts’ token balances at any point in time”.

The smart contracts can substitute the intermediary bodies in two separate ways. Primarily, the contracts can function as the mutual fund’s manager. In this case, the code written in them concludes complex techniques of fundamental or technical trading strategies, and the code is allocating the assets invested into the fund according to these lines of code. Hence, the trading strategy bought into never changes, and always act in the same way as it was agreed upon at the point of investment. On the other hand, smart contracts can function also as legal obligations toward real-life fund managers. By this, the contract is written on the blockchain, and it is executing itself automatically, making the investor of the fund in control of its investment every time, and the yields of investment can be transferred immediately, eliminating delays and potential non-payments in the process.

After the investor decides to close the position in the on-chain fund, the tokens issued to them get eliminated, the assets anchored to them are sold on a DEX, and the investor gets their value back in the underlying protocol’s token, equivalent in value to the assets sold.

2.6.2. Implementations of on-chain fund protocols

Blockchain based mutual funds can be created in several ways. First, it can be created similar to an equity-based crowdfunding project (Lambert, 2022). In this scenario, the protocol has selected trading codes or selected fund managers who are creating and executing the trading strategies, and the investing into these funds are open to the general public. In this system, the investors are getting tokenized equity shares in exchange for their invested assets, as part of a financial covenant, which is part of the on-chain fund's smart contract (Lambert, 2022). In this implementation, the fund managers or the automated strategies are not created by the public, but the people in charge of the protocol. Within these selected people, the span of influence on the fund can be regulated in several ways: it can be a common consensus between the protocol's management, it can be based in shares held in the asset management firm, or it can be allocated based on the merit of the fund managers.

However, on-chain funds can be created as an open fund manager infrastructure. In short, it means that anyone on the platform can create a mutual fund of its own, in the form of a vault, and the community can freely search for trading strategies most suited for them. In this iteration, not only the investment is open and decentralized from any intermediary institution, but also anyone can be a manager of a fund and can create trading strategies on its own. In this way, the most successful vaults are purely based on the merit of its creator, regardless of if they are part of the protocol or not.

A great example of such open platform that allows its users to invest in and create mutual funds is Enzyme Finance, which will be further analyzed as the subject of this research paper.

3. Methodology

In the analysis of the topic, the paper will investigate on-chain asset management's processes, advantages, disadvantages, and further expand the study on potential future resolutions to the issues examined. In this research, the investigation will start from the core conceptual ideas behind the application, and through the study it will continuously focus more and more on the relevant elements and technicalities of blockchain technology. As the practical part of the paper, the previously discussed technical background will be put into tangible context through analysis of Enzyme Finance, the oldest blockchain-based asset management firm. Due to the nature of my sources, extensive statistical procedures will not be applied to analyze the gathered material, but draw conclusions and highlight connections between them, culminating in a summary about the research's subject topic.

4. Technological Analysis of Enzyme Finance

To get a more in-depth look on how on-chain asset management firms can potentially work, how do they create value, what advantages do they hold against traditional mutual funds and where do they come short compared to them, the business operations of Enzyme Finance, the oldest on-chain asset management protocol running on the Ethereum blockchain will be analyzed.

4.1. Company Overview

Enzyme Finance, formerly known as the Melon Protocol (Trinkler & El Isa, 2018), is a DeFi asset management operating system that enables individuals to build, scale and monetize their own investment strategies via digital asset vaults. The company started in the beginning of 2021, after it overtook the network assets of Melon, and since its launch, the users of the platform has created more than 1,000 vaults, made more than 2,700 deposits, and as of April 2022., the platform has \$200 million digital assets under management (AUM in short).

Enzyme is powered by its own cryptocurrency, the MLN tokens, which are the native means of payment for many different operation executions on the site, such as paying for transaction costs and other different fees. The tokens are also acting as leverage against network effects and to organize the interests of Enzyme's stakeholders (the entities holding MLN tokens). In short, MLN can be bought in DEXes as a commodity, or it can be earned by developing on the platform, either with helping Enzyme grow with more DeFi protocol integration or with creating financial applications on the chain. While using the platform, vaults have a flat 0.25% fees on their assets under management, that needs to be paid to the platform. This can happen by changing most usually ETH to MLN, then pay the fees. After the payment, the MLN is "burned", meaning that they are getting removed from circulation. Therefore, the price of the MLN is driven upward. This buy-and-burn mechanism (also referred to as the MIP7 protocol update) is connecting the value of assets under management directly to the value of the platform, and as such, to the value of MLN tokens, resulting in bigger AUM equals to higher MLN prices. The more the platform is used, the bigger the stakeholders' wealth is.

Furthermore, the tokens are also representing voting rights in the platform's operations. Enzyme is governed by the Melon Council, a decentralized autonomous organization (DAO). This is a regulatory body, that is consisting of a limited number of individuals, voted in by the token holders democratically. The council do not have centralized governance over the

platform but can create developments or changes to the platform's policies, infrastructure, and services, and the MLN holders can vote on these submissions as a trustless, democratic society.

The goal of the company is to decentralize traditional asset management practices and lower the entry barriers for investors and hedge fund managers alike worldwide. The main take-aways from this vague objective are that potential users could include individuals and groups, investors and fund managers, and the use cases can vary between treasury management, index creation, and realizing complex trading strategies that can involve any financial processes.

4.1.1. User Types

To understand how different applications can be realized on the platform, it is important to know who can use Enzyme's ecosystem. Stated on the website, there are four main beneficiary groups identified: depositors, vault managers, DAOs, and token holders of DAOs.

Depositors: investing into financial markets can be very cumbersome, user-unfriendly, and unreasonably hard to navigate. Mutual funds are a good alternative for these issues, but the entry fees are way higher than what the average investor is willing to pay. On Enzyme, the low entry fees enable a wide group of people to invest in digital assets without the need for having large initial capital. On the site, most vaults represent a well-defined trading strategy that is transparent and easy to access, therefore any investor browsing the site can find the one most fitting to their needs.

Vault managers: on the other side of the vaults, fund managers are people who would like to create trading strategies, but the high fees and legal constraints to start a hedge fund eliminates them. Enzyme allows virtually anyone to start their own fund without legal process or large initial investments. Also, deriving from the platform's scalability, wide toolkit, and growing ecosystem, trading strategies on Enzyme can include lending, borrowing, liquidity provisions, derivatives, yield farming, token swaps, and able to include more than 250 digital assets.

DAOs: decentralized autonomous organizations are communities in which governance rely on blockchain mechanisms instead of a central leadership structure. From this decentralized model, many DAO finds it hard to manage their assets in a transparent, efficient way. On Enzyme, the delegation of permission can provide DAOs the

opportunity to solve their problems while also guaranteeing them extra services, such as accounting and safety measures.

Token holders of DAOs: while DAOs can also benefit from a decentralized asset manager, token (or in other sense, share) holders of DAOs also gain from these services. Individuals participating in these communities can monitor the DAO's treasury, and can be sure that efficient, secure measures are in place.

4.1.2. Vault types

To achieve its goal, the platform serves two important roles: first, an interface for vault creation, and second, a digital common ground connecting multiple blockchain protocols running on separated chains. Vaults are essential elements of Enzyme Finance. On the asset management platform, they are the infrastructure that recreates the roles of funds. Vaults are smart contracts which are either running a trading code as a programmed, autonomous mutual fund manager or regulating the fund's human manager as a digitalized legal obligation. To satisfy as many use cases as possible and to be interacted with and created by anyone, the vaults can be of four types based on their openness and trust relationships:

Public Vaults with Trusted Owner: Depositors of this vault are required to trust the Owner. As such, the Owner of the vault is disclosed, and legal documentation is usual.

Private Vaults: these vaults require 100% trust from the Depositors, but also form the Owner as well. Many times, investors come from a selected list of potential participants, and the vault follows a KYC (know your customer) guideline alongside with legal documentation.

Trustless Public Vaults: as the name suggests, trust is not mandatory between the Depositors and the Owner. In this case, the vault's smart contract will protect both sides from malintent. As a consequence, certain restrictions will be in place. The possibility to join the vault is free, anyone who finds these vaults via the search engine can stake their assets.

Custom Vaults: Enzyme is not limiting or nudging any digital creator to pre-select a certain solution from beginning of the vault creations process. In this case, all possible policy tools are available, and unique use cases can be realized.

4.1.3. Possible actions for the vaults

When creating a vault, many things can be personalized in Enzyme, with newer iterations of the platform allows users to change them after the initial creation. As a basic hygiene factor, the name of the vault, the symbol and ticker, and the denominated asset the vault is based on has to be determined. These assets can not only be original digital assets, but derivative assets can also create base for the vault.

As the next step, different fees can be optionally allocated to the vault. The payments are uniformly paid out in newly created shares, lowering gas fees (gas fee is the compensation crypto miners get for validating transactions on the blockchain) on the Ethereum chain. These payments can take four different forms: management fees, which are paid to the Vault manager every period, and calculated from the assets under management; performance fees, which are calculated from positive returns during a pre-defined period; and additionally, entry and exit fees can be implemented, the further based on the initially investment, and latter charged on every redemption. In-kind redemption and single redemption can possibly be charged at different rates to incentivize investors to make redemptions at larger values and subsidize Vault managers for their effort to manage single-asset redemptions.

Deposits can also be managed by the platform. Vault Managers can create a list of people who can transfer money to the Vault in return for Vault shares. However, the trade of vault shares on secondary markets are not prohibited by these lists (in a sense, these mechanisms can make Vault Shares similar to Restricted Stock Units), but by additional share transferring rules, that can be also customized by the fund's manager. Furthermore, the size of deposits can be controlled as well.

The handling of asset redemption is an important element of the site. In usual scenarios, closing positions and redeeming assets are available every second of a day, but in synthetic digital asset trading the delayed settlement design might not make instantaneous redemption possible. Thus, the Vault Manager can tailor the redemption policies of the Vault as well. In the options, it is possible to set up a lockup period for assets, specifying how long the vault shares are prohibited to be redeemed or transferred, the asset type in which the redemption can be executed is customizable as well, a threshold for single asset redemption can also be set up, minimizing the amount of assets to be present in the Vault at any time, and finally it is possible to set up a guaranteed redemption period, when the Vault is prohibited to trade in Synthetix (derivative digital assets), meaning that redemption can happen at an instant.

To reassure stakeholders in a vault, fund managers can specify policies to restrict certain behaviors. For examples, it can be regulated which protocols can the vault interact with, excluding platforms worth too risky to deal on. Furthermore, not just the possible list of protocols, but the feasible position types can be limited as well. In an attempt to mitigate risks, the platform also allows managers to implement slippage tolerance levels, which can be classified as a previously agreed period of continuous diminish of portfolio value. The level can be specified by both time horizon and value lost in percentage. And as a final policy tool, external position removal and asset position removal can be controlled also.

4.1.4. Strategies and Integrations

Furthermore, Enzyme acts as an orchestrator of a solution ecosystem. In short, a solution ecosystem is a network of entities that create a new product or service that satisfies consumers unmet needs by combining their capabilities under the management of an orchestrator firm, that manages suppliers and complementors of this ecosystem (Pidun, et. al., 2019). In practice, individuals, or communities go to the platform's application page. By connecting their wallets to the ecosystem, they have access to the resources of Enzyme. They can interact with the vaults on the platform, connect and deposit digital assets in return of tokenized vault shares, or close these positions by withdrawing their invested commodities by returning their vault tokens. On the other side of the platform, Enzyme is interconnecting several DeFi services, such as trading, lending, borrowing, yield farming, staking platforms, derivative markets, liquidity providers, automated market makers, risk mitigating entities, and more than 250 digital commodities. With this, Enzyme enables the platform to use complex and sophisticated trading strategies in its vaults, creates an environment where liquidity, asset redemption and closure of positions can happen at an instant. All fundamental building blocks of traditional asset management, just without the institutionalized middleman.

4.2. Unique selling points

In the on-chain asset management place, there are several other platforms trying to recreate what Enzyme has achieved, such as KR1, Scrypt, Insula and Unido, but the first-mover advantages and the strong community support makes Enzyme's platform the leading decentralized asset manager for several reasons.

To begin with, the platform is not only a vault creator with a cutting-edge toolkit for financial creators, but an ecosystem orchestrator, connecting multiple DeFi applications and digital assets to generate a common market among them, making a similar experience to traditional

asset management platforms. As the platform is running on-chain, the investment of assets does not require a custodian to be trusted with, it can happen in a trustless way as well, providing investors the possibility to never give up control over their digital commodities.

Deriving from the size of the platform and the tools provided, Enzyme enables users to create complex use cases on the platform. It can be trading in various asset types on different markets, creating treasuries for interest groups in a transparent way, providing initial funding as a VC or PE firm, and the list goes on. Consequently, the site engages in asset movements at a large scale, enabling it to utilize batching processes, driving gas fees down and making them lower, than trading on the whole Ethereum chain.

In addition, Enzyme tends to be more user friendly than other decentralized asset managers. As an investor, you only need to have a basic cryptocurrency wallet connected to the site, after that, anyone can search between different funds and can invest in the most fitting to their personal trading strategy. For vault creators, the site provides many presets and examples to follow, while also provides the freedom to create unique financial applications within the site's digital borders. And as a layman of decentralized technologies, Enzyme consults potential users of the platform, briefly introducing how can the platform be a solution for different financial problems.

And as last, the company structure of Enzyme makes the firm decentralized and democratic, while also connecting the value of the company to assets managed or by developments provided to the platform. Many other competitors listed above has a centralized governance, which can be practical in some cases, but it fundamentally undermines the decentralized emphasis on these platforms. With the Melon Council operating as a DAO, all MLN token holders have a democratic say in how the company should continue its operations, by having voting rights in development submissions. Furthermore, the price of the MLN is heavily linked to assets under management, meaning that it holds higher value if the company is handling more assets. As such, it incentivizes to either invest in MLN tokens (enlarging the AUM) or to make developments and cutting-edge financial applications on the platform (which can yield MLN tokens for the creators).

4.3. Advantages of the implementation

When formulating advantages regarding Enzyme, it is important to clarify the opposite side the comparison is being made with. As seen in the previous point, the company has multiple USPs over similar on-chain asset management platforms, and no one has comparable size

with the same core functionalities. Thus, Enzyme is going to be compared to traditional asset manager firms, as the maturity of the platform is more comparable to them than to digital asset managers.

4.3.1. Lowering bars for financial inclusion

To begin with, Enzyme in general lowers the bars of entry for both investors and fund managers. The only thing needed for an individual to invest on the blockchain is to create a crypto wallet, after that they can easily link their wallets to the platform, and search for investment opportunities best fit for their personal goals. For fund managers, it is not required to have any license or financial background to start a business, no initial seeding nor lengthy legal process to go through. After they sign up to the website, they can start experimenting and creating vaults with specialized use cases, and with the crowd funding nature of Enzyme, potential investments can come way easier. After launching the trading strategy, unknown investors can create larger pools of financial assets under their management by maintaining a good trading record. By this, the platform will self-regulate traders by their merit, and make the best traders shine without the needs of connections to capital and resources for legal procedures, unlike in the traditional financial world.

In addition, Enzyme is reaching out for unbanked and underbanked people, to achieve financial inclusion. According to the World Bank in 2017, 1.7 billion adults worldwide are unbanked, most of them coming from the poorest households in their economy. Furthermore, these people usually come from South America, East-Asia, and Africa. These regions would endure severe disadvantages without a proper financial service, as financial inclusion is a key element for seven out of seventeen United Nation Sustainable Development Goals (Demirgüç-Kunt, et. al., 2017). In response, Enzyme does not require any personal information for its platform, as the digital identifier of a crypto wallet is enough to uniquely recognize anyone within the system. As such, the site is a great hub for unbanked people to store their investments, trade according to their likings, or get involved in any financial application they deem worthy on the platform, while traditional financial institutes operate alongside robust bureaucratic frameworks and rule books, with little to no flexibility regarding legal documentations or minimum assets needed to be submitted under management.

4.3.2. Personalized value creation

As the platform can be seen as a hub for financial strategies and use cases, investors can find the most fitting trading patterns for their likings, and even more, if they have the knowledge and enthusiasm, they can create their very own trading algorithms as well. It is unheard of in old-fashioned mutual funds. The most similar approach to this is the example of RobinHood, but the key differences between the two trading sites are the custody mechanisms and the span of control of their governmental groups. Enzyme is a non-custodian platform, meaning that investors do not need to give up their assets to a custodian institute that will manage them. They will always stay in control of their resources, further making the platform investor-friendly and decentralized. And for company management, RobinHood had major issues with its central leadership during the Game Stop stock short-squeeze and its own IPO, when the firm acted multiple times against their users in favor of bigger individual market players or for their own benefit. These events highlighted how centralized ecosystems can exploit their user base and make decisions against their favor.

Which leads to the next big advantage of Enzyme, which is the transparent, decentralized operation of the company. In the financial world, the millennia's financial crises have shown that centralized corporate workings can cause major trauma on the global economy and has the potential to alienate the public from financial firms. In the case of Enzyme, the blockchain ledger shows in real-time who made transactions, in what volume, and how much assets are moving on the chain. It makes the flow of financial assets clear on the platform. Furthermore, on the arch of the firm's governing system a DAO is making decisions, which span of control is bounded by smart contracts and democratic voting by MLN token holders, making the platform closely connected to its users, keeping the DAO vulnerable to stakeholders.

4.3.3. More than just an asset manager

But Enzyme can be much more than just a decentralized mutual fund maker. The platform connects many digital assets and DeFi services, such as lending, borrowing, trading, derivative creation, yield farming, and the list goes. And on the platform, vault creation is not limited to trading schemes or saving accounts only. It enables financial creators to freely build unique financial solutions. This liberal empowerment opens gates in front of users to go beyond replacing traditional asset management. As an example, Enzyme has the tools for venture capital and private equity movements as well. As an ecosystem, the protocol is the leading digital asset platform that provides easy access to international access to capital

markets. With options for vaults to be private or public, and using smart contracts to recreate any financial operation, Vault Managers, that can potentially be entrepreneurs, can be selective who can invest in their vault, which can back a treasury account for their venture. As this quick analogy shows, Enzyme, with its large toolset and good integration of wide DeFi projects, can be much more than a challenger for asset management giants like BlackRock or Vanguard but can also host PE and VC companies' treasuries or new ventures' accounts, and be the market maker platform in these realms as well.

4.4. Issues with the implementation

Despite the revolutionary developments and wide range integrations of Enzyme, which make the company the biggest and best realized digital on-chain asset management firm, there are several issues and limitations the platform needs to overcome to reach bigger audiences and be trusted with more assets under management.

4.4.1. Technological limitations

As the project is carried out on the Ethereum blockchain, the implementation has inherent flaws coming from the technological side. First and foremost, the operation speeds are rather slow compared to traditional financial functions. As the proof-of-work concept is in place on the Ethereum chain, all nodes need to verify the solved chain, making the process painfully slow. In consequence of Buterin's protocol's popularity and widespread use, the gas fees (the transaction cost of digital assets) are rather high on Ethereum, as miners need to solve increasingly large equations to make a chain of blocks, creating a negative network effect on the platform. Ethereum is also only using the ERC-20 token standard. For Enzyme it means that other token formats and digital assets cannot be traded on the platform if the transaction takes place on the ETH platform. It can result in an inherently limited digital market size, that can hinder the firm's future ambitions. Furthermore, the early stages of blockchain development makes platforms like Ethereum vulnerable to genuine mistakes in the underlying coding environment. Bugs and glitches in the system are not uncommon, and it can make smart contracts fail on their own without any malicious intervening from a third party.

4.4.2. Illicit activities on web 3.0

Nevertheless, malintent in the web 3.0 space is also more common than in web 2.0 environments. Hacker attacks on digital assets can take form in a system wide attack on pooled resources or on individual e-wallets. In the first case the assets under management are being attacked, making the whole platform vulnerable, while in the latter case individuals and

separate entities are in the aim of an isolated attack. Furthermore, bad intentions can come in the form of rug pulls. In a brief description, rug pulls are web 3.0 scams. It can happen by pooling assets in a shady trading scheme, trusting someone with our assets without making sure the entity behind it is legit, or crowdfunding a project which at the end does not launch, and the resources provided are not given back. In all of these cases the custody of assets is needed to be transferred, so Enzyme's non-custodial regime can mitigate these affects, but the various applications possible to be carried-out on the platform makes space for such malintent to take place.

With the creation of a trustless space, illicit activities can also take place on Enzyme as well. As the platform is liberal with its user policy and does not strictly dictate the vaults' activity, it is easy to recognize that black market activities can be realized on the platform. Shadow banking, the describing term of bank-like activities carried out by non-bank financial parties, can happen also on the platform. This is the reason of blockchain technology's biggest current flaw: the lack of rules and regulations.

4.4.3. Lack of common regulatory system

Enzyme and the underlying Ethereum protocol as of now is not under a common regulatory framework accepted widely either in the web 3.0 space or in the financial world. Despite decentralization being a key selling point of both platforms, it is important for users to not only trust the platforms by themselves but by also a commonly shared rule set as well. If many participants in this place would agree on common boundaries, blockchain technology would be more trusted, and as consequence DeFi protocols would experience larger user bases and AUMs. How contradictory does trust in trustless systems sounds, it is important for services to have user confidence in them. Without them, they will always remain on the periphery. This unregulated environment also makes for no safety net for users. The responsibility of the users' actions is entirely on them, and even with genuine mistakes from the users or the platform these mishappenings cannot be corrected, and can hinder the user experience further, creating a perception about blockchain technologies to be similar to a gambling: involving immense risk with zero to none mitigating mechanisms in place.

4.4.4. Problems from immature state of Blockchain and Enzyme

The riskiness of keeping investments on-chain is amplified by the volatility of cryptocurrencies in general. The market of digital assets is rather new, and market shocks are much more apparent and widespread than in traditional markets. Furthermore, ETH and MLN

tokens, the two most important assets from the perspective of Enzyme users, are also volatile on their own. These grave shifts in commodity prices makes digital investment environments riskier than what the average investor would like. In addition, speculative attacks on these commodities are much more prevalent. Large holders of crypto assets (the so called “whales”) can easily shift the prices of each token, either depreciating investments by inflating the underlying currency, or making investment more costly on the platform by appreciating the denominator currency of the platform’s fees.

Enzyme as of now also faces the challenge of limited integration on its platform. One promise of the protocol is to connect as much DeFi implementations as possible. They are leading the way in this aspect, but the size of the ecosystem is still smaller than optimal, and the landscape of decentralized finance remains fragmented. It is not only limited to Enzyme not connecting all applications on the Ethereum chain, but there are multiple other chains such as Solana, that hosts DeFi applications. As the underlying protocols are different between Ethereum and Solana based DeFi applications, Enzyme cannot connect these worlds, only if the application starts to run on multiple chains. However, multi-chain operation of cryptographic solutions has their own fundamental problems, which may be even harder to solve, than to deal with separated protocol environments. Nonetheless, these limitations can hinder the objective of liberal markets, as resources can only be acquired or sold to in a limited financial space, making market forces bounded. As the Enzyme community grows, its acceptance and the group of DeFi projects interconnected via the platform will increase as well, but as of now, its network cannot be compared to traditional asset management firms.

4.4.5. Lack of user-friendly surface

And finally, one of the biggest challenges for the company to overcome is the public-readiness of the application. According to Enzyme’s own estimates, DeFi applications are appealing to 300 million worldwide (which is still a far less than an optimal amount), but their overall penetration rates are an abysmal 1.3%. It means that DeFi as whole are not user friendly enough for people to take a shot at it. This is not just the culmination of the aforementioned issues regarding Enzyme, but also the result of the lack of confidence in DeFi. These problems are further topped by the high basic knowledge required by investors to use these implementations. In many cases, DeFi protocols are written mostly to tech-savvy people with intermediate to high knowledge in blockchain technologies and financial literacy. This combination results in service descriptions which are hard to decipher and can be perceived as malintent or shady. For the average investor it is not clearly stated in common

tongue what does the protocol do, how can it provide value to them, and how can they trust the system. These elements are making the navigation in the DeFi space cumbersome and frustrating. As an outcome, many people who would be willing to use blockchain based financial applications turn away from them, while blockchain sceptic people even find them as proof of their beliefs.

4.5. Potential Solutions

Despite the many listed problems and shortcomings of DeFi and Enzyme, the enumerated issues can be solved by comprehensive evolution on three fronts: technological, legal, and user interface.

4.5.1. Technological Development

The first set of problems recognized were the technological ones: slow transaction speeds, high gas fees, and genuine mistakes in the coding of the underlying blockchain protocols. These issues in the DeFi environment are in the center of focus, and all protocols are trying to solve them. The potential solution for all of these is the scaling of the blockchain. It can happen in three ways: first, by expanding the original layer of the protocol (layer one scaling), building more layers on top of the first layer (layer two scaling), or creating parallel chains next to the original layer (sidechain scaling). A more sophisticated scaling solution is rollups, which is the merge between layer 2 scaling and sidechain scaling. In brief, it is the batch execution of transactions outside of the layer one chain and posting the transaction data after execution on the main layer, validated by the underlying protocol's consensus mechanism.

These scaling methods have their own benefits one by one, but three characteristics are true for each of them: they are infinitely scalable, they are secure by using the protocols consensus mechanisms, and they make the operations more sustainable, resulting in driven down gas fees, quicker transactions, and less pollution in the environment.

As it is at the core of Enzyme's operation, Ethereum's further progression in its scaling evolution, Ethereum 2.0 can mitigate and solve many of these technological issues. The ETH2 protocol is a combination of layer one, layer two, and sidechain scaling. At layer one, Ethereum is switching from a proof-of-work model to a proof-of-stake model. This means that in the future, the validation of code does not require miners and their hardware to solve a long and energy extensive equation to generate the next block on the chain. Instead, it will rely on validators, who are staking a minimum 32 ETH capital to the system, making them eligible to become validating entities on the chain. As a reward, they get transfer fees and

yields on their investment. By this, the incentives to become a network operator switches to economic incentives, rather than electronic consumption. Furthermore, the high initial capital needed makes the solution proof for a 51% attack, which is the situation when one party holds majority of the network. This can hardly happen, as the capital required to do so is immense. To make it more secure, a slashing mechanism acts against dishonest validators, meaning that malintent during a transaction process results in the capture of the validator's staked ETH. And to make it more accessible, it is possible to stake less than the minimum required capital via staking pools, to become a partial validator of the system.

In addition, a sidechain solution called sharding is part of the Ethereum 2.0 upgrade. Sharding means that the whole blockchain will be split into multiple database instances. It makes the processing of chains way less power exhausting, making the chain more sustainable and more secure, as it will lower the barrier for potential validators. At first, sharding will be only data storage focused, but with the potential implementation of rollups or layer two expansions, they can partially replace transaction processes from the main chain. It can be either done by the general-purpose rollups or by the specifically focused layer two offloading.

As a result, Ethereum will keep its secure, decentralized nature by implementing proof-of-stake into its validating mechanism, making the system even more effective against 51% attacks, and switching from energy incentives to economic incentives, making the platform more sustainable. With sidechains and rollups, the energy usage for solving a block decrease severely, making gas fees to plummet, and increase transaction speeds and transaction throughput. With these drastic changes, many bug and exploit fixes happen in parallel too. In addition, the scaling of the platform has positive network effects, and can result in more people examining the chain closely and pointing out potential vulnerable points. This can come down to the reduction of genuine mistakes in smart contracts and transactions.

4.5.2. Potential regulation in the DeFi space

The second set of problems can be classified by what is resulting them: the lack of regulations in the DeFi space. Illicit activities can happen on many platforms, Enzyme included, because the decentralized nature of the solutions also provides complete liberty over the entities' actions possible, without a mechanism keeping them in line. The lack of trust in these decentralized finance applications are part of the fact that common regulatory systems are not in place. Liberty and trustless operations are part of the DeFi space, but it does not contradict the fact that boundaries and some level of trust needed in these platforms are needed to

increase confidence in potential users. And as further consequence, the lack of trust and lack of regulatory skeleton makes these digital assets drastically volatile, which is not only bad for current investors, but also making potential ones stay away from the platforms.

However, these issues can be solved by regularized rule sets. It is clear in the DeFi space that boundaries need to be set, but there is no consensus how shall it happen: is the growing number of users and the maturity of protocols enough to self-regulate themselves and create unionized rules along interconnected parties, or an initial regulatory framework is needed to start the further wave of increase in the userbase? It is a typical chicken-or-egg dilemma, that is hard to answer as of now. As the DeFi space is very fragmented, it will likely happen simultaneously, and the stronger force will overcome the other, and create the common legal environment for the protocols.

However, as we have seen in Enzyme's case, DAOs can be a potential solution for this. These decentralized communities are reliant on democratic voting regarding their protocol's future. It is not a far cry to see that many DeFi projects can join up to create a DAO, that jointly creates the legal borders for the decentralized finance space. It is important to mention that the scattered digital finance environment needs to come together to make such venture successful, but with Ethereum actively nurturing protocols using their infrastructure, or Enzyme connecting multiple solutions together as an operating system, the signs are clearly there that the DeFi ecosystem is not as competitive as the traditional finance world, and the willingness for collaborations are a win-win situation for every party as of now.

4.5.3. Public-friendly innovations

And as a final batch of problems, Enzyme needs to overcome the common issue with DeFi: the lack of public-friendly attitude on the protocols. If we look at the low penetration rates DeFi protocols have achieved over the years, it is clear to see that the barrier of knowledge required to navigate on these platforms are way higher than it should be, and it results in lack of confidence to use these platforms.

However, as the early days of decentralized finance are behind us, many protocols, including Enzyme, has started to shift from aiming for tech-savvy users, to broader audiences. As for our subject company, it has come in the form of its recent iteration, Sulu v4. Sulu is an interface upgrade for the Enzyme Finance app. It caters toward new users in different ways. First, it makes the UI (user interface) of the app easier to perceive, by making the dashboard more stylized and label functions in simpler words. Furthermore, it does not describe every

option in detail, but briefly summarizes them in common tongue terms. In addition, the search engine is revamped as well. It is now possible to search for vaults by different characteristics, such as function, size, minimal assets required, denominated asset classes, and more. By this, beginner DeFi users can search for financial applications without comprehensive formulation of their needs. And for creators, Sulu provides use case templates, which are preset configurations of the platform's toolkit. With this, the creation of financial applications is supported by the developers themselves. Furthermore, for more advanced creators and financial entities, Enzyme provides consultation as well, to convince them that the platform is suitable for their use case, and it can be a vehicle to realize these applications.

5. Conclusion

Web 3.0 and blockchain technology has already started to make its mark on the world, and this paper has focused its attention on the relatively unmapped world of the Decentralized Finance movement, which is the collective name of financial applications realized on blockchain protocols. By examining Enzyme Finance, the literature regarding on-chain asset management firms has expanded.

Enzyme Finance is an operating system for asset management that combines an extensive vault creation toolkit with an interconnected solution ecosystem. It is a digital space, where creators of financial application can freely use the protocol's vast library of interconnected DeFi projects and digital assets without certifications and large fees, while investors can browse freely among solutions to buy into, without sacrificing their need for personally suitable investment strategies, and without a larger capital requirement. As a result, Enzyme lowers the barriers for financial inclusion, enables investors to follow personalized value creation schemes, and to even go beyond traditional asset management and replicate other functions such as treasury creation or venture capital flows.

With the utilization of blockchain technology, Enzyme Finance not just making hurdles lower and more manageable, than traditional asset management firms, but also enables its users to make personalized solutions, and even go beyond conventional frameworks. Furthermore, the decentralized environment of the firm makes the platform trustless and non-custodian, which results in a more secure financial market maker. And with the democratized governance of Enzyme, users of the platforms have a direct say-in to the policies. However, the company needs to overcome its own barriers to break into the mainstream of asset management. The technological immaturity of the platform creates a perception of unsafety in the eyes of

everyday users. The potential illicit activities on the site, combined with the lack of regulatory frameworks alienates regular users, which are further topped by the lack of user-friendly interfaces. Nevertheless, these issues can be overcome by technical developments, creation of harmonized rules and more catering toward customer needs.

Enzyme Finance is an asset management platform, that provides a fully-functioning, comprehensive service, which can be a real solution to issues regarding intermediary asset managing institutions. Even though the platform is ahead of mass adaptation, potential fixes are feasible in the near future, making it an innovative contender to reform the asset management industry.

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