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Course of Blockchain and Cryptocurrencies

How crypto will save the unbanked

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How crypto will save the unbanked

We live in a world that is always more characterised by the so-called "Digital Revolution", representing the shift from mechanical and typical electronic technologies that have characterised the industrial revolution to the new economic domination of IT (Information Technology). Indeed, the 21st century is seen as the period in which emerging technologies radically change everyday life and how any kind of organisation behaves. Naturally, the principal and conceivably, the most functional innovation is "theIinternet". The Internet is necessary for the concretisation of many

emerging technologies because it makes everyone live in a colossal network where the only condition to be ubiquitous is an Internet connection! Indeed, we sign contracts, close deals, purchase goods and communicate with people through the web. Moreover, thanks to the internet affordances: “Speed and Reach” and “Temporal flexibility”, everyone can have an impact on everything, from everywhere and simultaneously.

Therefore, decentralisation, the process by which people and organisation move without a central authority, is a natural consequence of the Digital revolution. It is also a natural consequence that theIinternet will affect the world of finance. When it comes to finance, the most frequent activity that people perform is to execute a transaction, and on the web, we can concretise transactions with more transparency, safety, and efficiency. The technology that is making this possible is Blockchain technology.

Thanks to Blockchain technology, it is possible to trade digital currencies known as cryptocurrencies. A cryptocurrency is a medium of exchange in a digital form, decentralised and encrypted. A cryptocurrency is different from fiat currencies because there is no central authority that handles the value. Meanwhile, the government issued a fiat currency, the Euro or the U.S. Dollar. Its value can be controlled through financial policies and open market operations that affect the interest rate.

Moreover, fiat currencies are sustained by banks. A bank is a financial institution that allows people to make a deposit and simultaneously make a loan. Therefore, it becomes vital for people to rely on banks. However, the problem is that, currently, there are approximately two billion people worldwide who have no access to banks or almost any other financial service. Hence, there is a huge disparity between these people, commonly known as “unbanked", and the others who have access to banks. At the same time, a large majority of unbanked can access the internet through their smartphone or laptop. Therefore, an unbanked could easily access a cryptocurrency wallet by having cryptocurrencies as a commodity. Thanks to cryptocurrencies, income, and location would no longer represent a barrier for those who do not have access to prominent local commercial banks.

To understand if cryptocurrencies can help this part of the population without access to a bank or any reliable credit institution, we will describe what Blockchain Technology is and how It allows people to trade their cryptocurrencies safely and efficiently. Moreover, we will analyse decentralised Finance (DeFi), its main pillars, and how valuable it can be. Additionally, we will compare the traditional banking system, involving the classical centralised finance model, with the solutions that Decentralised Finance provides. Since this analysis includes technical aspects of the mechanism behind cryptocurrencies, we will understand if they can be stable, safe, and efficient to provide a solution for the unbanked (Euromoney learning, 2022).

Chapter 1
Blockchain Technology: What it is and How it Works.

Blockchain is a system of recording data and pieces of information in a way that makes it almost impossible to hack, change or cheat the entire system. A blockchain is substantially a digital ledger of transactions that is replicated among the entire network of computer systems on the blockchain. Each block in the chain contains a certain amount of transactions. Every time a new transaction occurs on the blockchain, a record of that specific transaction is combined with every participant's ledger. The decentralised database managed by various participants is an example of Distributed Ledger Technology (DLT). A blockchain is a form of DLT in which transactions are recorded with an unmodifiable cryptographic signature called "hash", a function that meets the encrypted demands needed to be solved for blockchain computations.

1.2 Double Spending Problem

It would be rational for a person who does not know blockchain technology to ask himself: "How do I make sure that a cryptocurrency is not used twice if it is not like physical money?" This scenario represents the so-called "Double spending problem". Blockchain technology provides a solution to this problem. The blockchain is secured by miners who gain rewards as an incentive to protect the whole blockchain. Indeed, when a person Y wishes to execute a transaction, it is still unconfirmed or pending, a transaction waiting to be added to a block. Once an unconfirmed transaction is included in a block, this cryptocurrency movement has been "written" to the blockchain's public ledger.

Consequently, it becomes a "confirmed" transaction. Once a transaction is confirmed, it is assigned to the recipient and is validated by the entire network through specialised cryptographic proofs. This means that it cannot be double-spent. Consensus algorithms are used to confirm transactions and produce new blocks to the chain . One of the most frequent is the "Proof of Work", but there are others such as the "Proof of Stake". They are useful to prevent the double-spending problem and fundamental to exponentially increasing safety and efficiency, in terms of energy consumption, among the blockchain (Frankenfield, 2022).

1.3 Proof of Work

The proof-of-work model is a consensus algorithm used to confirm and record transactions among cryptocurrencies. Every cryptocurrency has a blockchain, a public ledger made up of blocks that registers the executed transactions. By applying the proof-of-work, each block of transactions has a specific hash. For the block to be confirmed, a crypto miner must generate a target hash not higher than the one of the block. To achieve this, miners use mining devices that rapidly generate even complex computations. The goal is to be the first miner finding the target hash because that miner

is the one who is entitled to upgrade the blockchain and receive back crypto rewards. Proof of Work in cryptocurrency works well because finding the target hash is hard but on the other hand, verifying the right target hash is not a complex procedure. This process is tough enough to prevent the manipulation of transaction records. Hence, it is effective enough to prevent the double-spending problem, and once a target hash is found, it is easy for other miners to check it (Coinbase, 2022).

To better explain the PoW, we will write a simple program that emulates the PoW used for Bitcoin. This program will receive an input a block of data, then is going to add as a string to the data a nonce which starts from zero; moreover, it will compute the "SHA-256" hash of the resulting data+noce that we have obtained, then if it does not fulfil the requirement, it increments the nonce by one united restart from step 3. Finally, when the requirement is going to be fulfilled, there will be the print of the hash, the block data, and the nonce.

```
#Proof of Work

Input = "qwe"

#encoding is important because
#it represents how the data type related to numbers are traslated
#into binary numbers by usig UTF-8

Y = Input.encode()

print(Y)

from hashlib import sha256

Y = 7

Z = 0 # The value of Z it is still unknown

while sha256(f'{Y*Z}'.encode()).hexdigest()[-1] != "0":

    Z += 1
print(f'The solution is Z = {Z}')
```

The language used is Python and the hash function, as we said, is the SHA-256, the most widely used in Proof of Work mechanisms. One of the most critical aspects of this consensus algorithm is that it has mathematical limitations in terms of scalability that are lower than the hardware limits. Especially, the combination of block frequency and block size must be bounded to maintain security in the long term. Additionally, it is not optimal in terms of energy-consuming. These are a

few of the reasons why PoW is not efficient. Therefore, we have other consensus algorithms such us Proof of Stake (PoS) which consumes energy more efficiently than the typical Proof of Work.

1.4 Proof of Stake

On the other hand, there is the so-called “Proof of stake”, another emerging consensus algorithm, which will decrease the amount of computational effort that it takes to verify blocks and transactions. This is crucial to maintain the cryptocurrencies and the blockchain always safer. Proof-of-stake uses the machines of coin owners to verify blocks. The owners offer their coins as collateral to get the chance to validate blocks and become a validator. Therefore, Coin owners become “validators" rather than miners. To become a validator, a coin owner has to "stake" a certain amount of coins. For instance, the minimum requirement for Ethereum will be equal to 32 ETH, that need to be staked before a user can be considered a validator. After that, many validators validate blocks, and when a specific number of the validators verify that the block. Then, that specific block is accurate, finalised, and closed.

One of the reasons for trust in validators is that they will lose part of their deposited stack if they approve fraudulent transactions. There are several proof-of-stake mechanisms, and they utilise different procedures to validate blocks. For instance, Ethereum uses a partitioning technique called “sharding" for transaction submissions.

Sharding is important to make it easier because the more users are spread in any blockchain network, the slower the network becomes; this deductible mechanism leads to significant latency. Sharding can improve network latency by splitting a blockchain network into separate shards where every shard has its data, separated from other shards.

A validator verifies transactions to add them to a shard block, requiring at least 128 validators. Once shards are validated, the block is generated. To make this happen, two-thirds of the validators must agree that the transaction is valid, then the block is closed.

One of the main objective of the proof of stake is to decrease the scalability and environmental concerns that negatively characterise the proof-of-work (PoW) protocol.

1.5 Proof of Stake vs. Proof of Work

Many people consider the Proof of Stake to be better than the Proof of Work because in the PoW, there can be the so-called “Mining Pools”, where miners can combine their hashing power and come together to get a huge competitive advantage in getting rewards. This is considered bad for the unfair competition among miners because it can increase the degree of centralisation that the blockchain has.

On the other hand, PoS has validators that do not mine the block. Instead, they apply a process of minting or forging the blocks. To become a validator, there must be an amount of coin deposited as a stake. The higher the stake and the higher the chances of being selected as a validator. This may

not seems fair, but it is considered by many people to be fairer than the PoW because, with Proof of Work, people with money can take advantage of the economies of scale, that is because the more they invest in their hashing ad computational power, the less they will spend in the future for it. Hence the chances to get rewards would be unfairly distributed.

So far, we have shown what blockchain technology is and how it works, but is blockchain secure to be a fundamental part of protecting cryptocurrency transactions to the unbanked population? The answer is represented by, perhaps, the most important pillar of blockchain technology: cryptography. Cryptography is the science that uses mathematics to encrypt and decrypt data. When the data is encrypted, there is huge prevention of unauthorised access. That occurs because the private key is needed to encrypt and decrypt a specific message, which is shared among those entitled to have certain access. Additionally, there is the public key, also known as asymmetric cryptography; this is a cryptography system which utilises a match of two keys: a public key (which may be known by more people) and a private key.

All blockchain transactions are secured by cryptography. Indeed, every block contains a unique private key that is verifiable through a public key, and if there is a change to transaction-related data, the block becomes invalid. This shows the reliability and safety of blockchain technology. However, the unbanked population would get cryptocurrencies as a commodity and indirectly promote a decentralised model of finance; that is why it is also important to know what Decentralised Finance is (DeFi) and understand how and why this is helpful for those who do not have access to a reputable commercial bank.

Chapter 2
What is Decentralised Finance (DeFi), and How Can it Help the Unbanked Population?

While traditional finance relies on a centralised system made up of central banks and commercial banks, which provide fiat currencies and supply money to control the interest rate and the quantity of currency circulating, Decentralised Finance, also known as “DeFi”, allows everyone with an internet connection to access to financial products and execute the transactions through a decentralised and secure blockchain network that we have just described (Rakesh, 2022)..

Indeed, thanks to DeFi, there is no need for intermediates, just like brokerage firms, commercial banks, or any credit institutions, that is because people have the opportunity to concretise payments by using an immutable public record of transactions. Decentralised finance is an example of how finance can be democratised. This occurs because central institutions are replaced, characterised by intermediates, with peer-to-peer relationships that do not require intermediaries. To understand the potential that DeFi has for helping the unbanked population, imagine a hypothetical scenario where the financial services available to us now, just like loans, savings, and insurance, could one day exist on a blockchain network rather than banks (Melita, 2022).

Indeed, DeFi makes people initiate many transactions and financial activities that are banks' acumen. DeFi covers them all, from the most basic just, like lending and borrowing, earning interest, and buying insurance, to the most complex ones, such as trading assets, derivatives, etc. As we have suggested, this would help that part of the population with low income who cannot access a reliable credit institution. It is already deductible from the blockchain technology how strong and secure DeFi is. First, however, we will get into details and explore the main five pillars of Decentralised Finance: smart contracts, Stablecoins, Lending, and Borrowing, Insurance, and Decentralised Exchange. This exploration will let us better understand why this innovative mechanism of doing finance can be helpful for the entire world (Melita, 2022).

2.1 What Smart Contracts are and how they work

Smart contracts are represented by treated and concretized programs on a blockchain network. A smart contract is expressed and described by a code that gives the conditions that will produce the outcome that both or more parties have agreed upon. A smart contract runs on a decentralised blockchain rather than a centralised server. Therefore, they allow multiple parties to come to a planned result accurately.

Unlike a system of centralised finance, with a typical contract, we can never know in advance if a person will execute a particular transaction representing both: liability (obligation) and asset. Instead, with smart contracts, we have instructions written through a code that is immutable and accessible; that is why it is almost impossible to cheat for anybody; the program must execute any

transactions characterising any agreement. Smart contracts are the dominant infrastructure for automation because they are not controlled by a central authority or a key admin. As a result, they cannot be vulnerable to single points of attack by attempts of fraudulent actions.

Indeed, in multi-party agreements, smart contract applications will decrease the counter-party risk, increment efficiency, reduce costs, and provide transparency in executing a specific agreement. Smart contracts are tamper-proof programs structured on blockchains. They basically have the following mechanic: "*if/when y event happens, execute x action*." This simple interpretation makes anyone understand how a code works, why it can be applied to agreements and why it is mathematically impossible to cheat and verify fraudulent actions since the instructions led by the code are "immutable".

Moreover, it explains why it is transparent since the same code is "accessible". A smart contract has the potential to have multiple conditions, while one application can have numerous smart contracts to sustain a mutually dependent set of actions. We also have the opportunity to program with many smart contract languages, one of the most frequent and popular is "Ethereum's Solidity". Any developer has the opportunity to make a smart contract and upload it on a public blockchain for their specific purposes. For instance, an aggregator automatically puts their funds to the most valuable earning application.

Many smart contracts give freedom and independence to the parties, even in multiple agreements with many people behind it; that occurs because, for the smart contract execution (instructions run by codes), the parties do not necessarily need to know each other, that is why their degree of freedom and independence is much higher than the freedom which they would have by stipulating a typical contract in a centralised system of finance. Indeed, the instructions and conditions of a smart contract can define exactly how users can interact with it, involving who can interact with it, when, and which inputs and outputs they could obtain. Decentralised finance consists of using and applying smart contracts to execute and make traditional financial actions and traditional financial products (Chainlink, 2022).

2.2 Stablecoins

The next pillar of Decentralised Finance is represented by the so-called Stablecoins. Since the fundamental trust from the people in cryptocurrencies is negatively affected by their not deniable volatility, this becomes, perhaps, the most important pillar sustaining the model of decentralised finance. Indeed, from the name, we can easily deduce that Stablecoins are cryptocurrencies whose value is stable. The value of the Stablecoins is matched, to the value of another currency, to the value of another financial instrument or commodity. Indeed, they are tied to a real-world asset. For instance, the price of Stablecoins such as "Dai", "tether", and "USD" is tied to the United States Dollar. Therefore they attempt to keep a constant exchange with fiat currencies to be as stable as

possible. They are intended to be protected from high volatility. This means that Stablecoins are adaptable to payments that we perform every day and to be considered a store of value and well. As we have reported, Stablecoins are backed by different sources, and the fiat currencies, further cryptocurrencies, algorithmic function, and precious metal-backed Stablecoins (Hayes, 2022).

2.3 Different backing of Stablecoins

Unlike other cryptocurrencies with a value that can easily fluctuate, “fiat-backed Stablecoins" have been designed to have teeny price fluctuations. That occurs because the assets on which they are backed are very stable. A practical example of their strength is the cryptocurrency exchange Coinbase which offers a fiat-backed Stablecoins called “USD” coin, which can be exchanged on a 1-to-1 ratio for one U.S. dollar. Furthermore, we have “Crypto-backed Stablecoins" backed by other crypto assets. For example, one crypto-backed stablecoin is “dai, " which runs to the U.S. dollar and runs thanks to the Ethereum blockchain. Additionally, there are “Precious metal-backed Stablecoins” that utilise gold and other precious kinds of metal to maintain a stable value. Moreover, there are the “Algorithmic Stablecoins,” which are not backed by any asset, but to keep the value of a digital currency stable, these Stablecoins use algorithms designed for making actions that are going to maintain a stable value. For instance, if the price of an algorithmic stablecoin is fixed to $2, but the stablecoin assumes a higher value, the algorithm is designed to automatically release more tokens into the supply to take the price down, therefore keeping the value stable.

2.3 Lending and Borrowing

The concept of “lending and borrowing” is, and has been, one of the most crucial aspects of any financial system, particularly in the “Fractional - reserve banking”. In the centralised financial system, the application of lending and borrowing is represented in a scenario where lenders provide a certain amount of money to borrowers who have to pay back this money by adding an interest rate. Meanwhile, in the context of Decentralised Finance, there is no need for a central entity or an intermediate such as the bank. As a matter of fact, everybody would need just an internet connection to access several protocols which allow users to become lenders or borrowers in a complete decentralised fashion, in a such a way that any individual has full control over its funds everywhere and at any time. All of this is made possible through the adoption of smart contracts which act on an open blockchain, such as Ethereum. When using DeFi protocols such as “Aave” and “Maker”, users who want to become lenders must offer tokens in a so-called: “money market”. This is done by a person who sends their assets to a smart contract programmed in a way that acts as an automated digital intermediary to make other users borrow a specific number of coins that the lender has deposited (Jagati, 2021).

2.4 DeFi Insurance and its Ecosystem

DeFi insurance provides insurance, or "purchase coverage," against losses caused by events in the DeFi industry. For example, if you are an individual or even a business with capital locked up on a DeFi platform. Since you understand that you could lose your capital if this platform or protocol is violated, you want to insure yourself against these risks. So you go to a DeFi insurance company and pay a specific amount to be covered to prevent the potential loss of capital due to a particular and pre-determined event. Some scenarios which DeFi insurance tries to prevent can be represented by exchange hacks, attacks on Decentralised Finance protocols, smart contract failures, or even if a stablecoin price crashes; this is a further demonstration of the strength behind the cryptocurrencies, which are designed to be stable, unlike the others which are characterised by high volatility.

The principal actors in a DeFi insurance ecosystem are the so-called “cover buyers” and the “cover suppliers”. The cover buyers pay a premium in terms of cryptocurrencies to be ‘covered’ in a scenario where a specific negative event occurs. These premium paid by a cover buyer goes from its crypto wallet to a “Capital Pool”. Meanwhile, there is also the cover supplier, which locks upon capital in the same Capital Pool. If the ‘covered event’ happens, the cover buyer can file a claim ad receive a specific amount of cryptocurrencies from the same capital pool where the cover suppliers have looked up their capital. In contrast, the cover supplier receives what the cover buyer pays from the same capital pool to prevent certain events. The capital pool is controlled by the blockchain-based smart contract. The smart contract is accessible, transparent, and immutable to all the participants in this DeFi insurance ecosystem (Bijkerk, 2021).

2.5 Decentralised Exchange

Decentralised exchanges are peer-to-peer marketplaces where people who want to trade cryptocurrencies can do this directly, without devolving management of their funds to any kind of intermediary. These transactions are facilitated by the automatic execution of smart contracts based on a blockchain. Decentralised exchanges use smart contracts (automatically executed protocols) to facilitate transactions between individuals without limiting the use of the coins. There are three methods of managing a peer-to-peer system where people can trade cryptocurrencies directly. The first one is called "on-chain order books", then there are the "off-chain order books", and additionally, we have the "automated market maker access”.

In the on-chain order book, all transactions are recorded on the blockchain. So it is not just about the actual purchase but also the purchase request or the cancellation of an order. It's the pinnacle of decentralisation, but the need to put everything on a blockchain can make it less efficient, more expensive, and even slower. Moreover, there are the off-chain order books hosted outside the distributed ledger of a blockchain and one positive aspect is that there is less energy consumption in

terms of gas. In addition to these, there are just computer programs that automate the process of providing liquidity; this is important to reduce the participation of intermediates drastically. Decentralised exchange is important because it makes the process of trading cryptocurrencies less redundant and more efficient in terms of energy consumption and fees. For instance, in a centralised exchange, there can be a limited number of cryptocurrencies to trade, higher fees, and greater consumption in terms of gas energy, instead, with a decentralised exchange like “Uniswap”, built on Ethereum’s blockchain, people can trade directly, and the use of smart contracts makes everything more efficient because the investors who send their cryptocurrencies to earn interest on their holdings directly become “liquidity providers” in the ecosystem.

So far, we have seen the transparency and safety of the smart contracts; the mechanisms which make it possible to keep stable a value of a cryptocurrency with the absence of volatility provided by stablecoins; the comfort in lending and borrowing without intermediates; the safety behind insurance provided by DeFi and the peer to peer system in trading cryptocurrencies with decentralised exchange that allows people to trade their digital currencies safety and most importantly directly. These factors that we are obtaining during our analysis are important to understand that a person in a difficult situation with a low income but with an internet connection could easily access a digital wallet safely and use as a commodity a digital currency with a stable value.

The alternative to this scenario can be expressed by the correspondent entity of a decentralised exchange in a centralised context of finance: a bank.

Since many people still believe that a centralised system of finance and a bank can be the solution for the unbanked, it is a must to represent the current situation of the unbaked in a centralised system of finance and compare DeFi with Bank System. Only after we will be able to make a fair balance between the effectivity that banks have on the unbanked and the effectivity that blockchain technology and cryptocurrencies in a decentralised system of finance can have on the unbanked (Cointelegraph, 2022).

Chapter 3
Banks vs. Decentralised Finance

A bank is a financial institution that receives deposits and makes loans. This financial institution may also provide further services, just like currency exchange. There are many types of banks, such as retail banks, commercial, corporate, and investment banks. The two main forms of banks, which macro-economically describe the centralised financial system, are central banks and commercial banks. To understand the importance and the influence of banks and why people unbanked are seriously penalised in a world that has a centralised system of finance as dominant, we need to define what central bank and commercial banks are, what they can do, and how they can affect people's life and the entire economy (Sunrise Banks, 2022).

3.1 Central and Commercial Banks vs. DeFi

Central banks and commercial banks are the two main expressions of credit institutions globally. A central bank is the main institution that handles the monetary system in a country by managing the money supply, creating monetary policies through open market operations, and regulating the quantity of domestic and foreign currency circulating. A central bank's top two purposes consist of making monetary policy and supervising commercial banks in the country. We will see how a regular person who depends on banks is affected by these two functions and how it could be affected in a decentralized system of finance (Sunrise Banks, 2022).

3.2 Monetary policies

A central bank executes monetary policy by managing the economy and maintaining the so-called price stability, which is reached by setting the interest rate to a certain level and regulating the money supply. Monetary policies impact people because if a central bank raises interest rates, it would cost more for a commercial bank to borrow money. Therefore, people should pay back a higher amount of money, including the higher interest rate. Moreover, it would penalise people with low income who risk not afford higher rates and become unbanked in a period of restrictive monetary policies. Instead, when it comes to Lending and Borrowing in Decentralised context of finance, it would be easier and more effective, particularly for those who, given their poor condition and bad location, do not have access to a commercial bank. Indeed, these people would need an internet connection and a device to be in touch with their wallets and trade in a decentralized exchange through a peer-to-peer system. Their cryptocurrencies, likely Stablecoins, could be used as a commodity for daily transactions (Sunrise Banks, 2022).

3.3 Supervise Commercial Banks

Another important function of a central bank is to regulate and supervise commercial banks because there is the need to make sure a fair way of operating against the public and, most importantly, keep the credit institution safe. Indeed, central banks tend to limit the risks by monitoring the liquidity

that commercial banks need to perform regular financial operations with the public and not crush them. That is why there is a need for a minimum liquidity requirement for any commercial bank. It may be rational to question ourselves how in Decentralised Finance with cryptocurrencies, we can make sure that there is no lack of liquidity?

We can answer this issue, which we have been explaining in paragraph 2.5, which describes decentralised exchange. Indeed, in a decentralized exchange like “Uniswap” built on Ethereum’s blockchain, potential investors will send their cryptocurrencies to earn interest on their holding by using smart contracts. Hence, they become “liquidity providers” in the ecosystem. One example states that even if a system is not centralised and does not provide careful supervision on its institutions, there can be a logic that makes the whole mechanism not run out of liquidity. Moreover, since this logic is affected positively by the need to get capital gain and speculate from investors, it will always work; this means that there will hardly be a lack of liquidity in Decentralised Finance.

So far, we have seen the most crucial type of banks and their principal functions in a centralised finance system, then we have compared these two main functions in a scenario with DeFi.

Since fiat currencies are the most accepted today’s economy, we have also understood how vital it is for a person to have a reliable commercial bank to get loans and execute the most basic financial operations. Although, despite this, not everybody, due to their income or location, has the opportunity to interact with a decent commercial bank; this part of the population is known as unbanked (Sunrise Banks, 2022).

3.4 The World’s Unbanked Population

“Unbanked" is a term used to define adults who do not use banks and banking institutions. This portion of the population is often verified in less developed countries or poorer parts of developed and advanced countries; the lack of money and the lack of trust in the banking system, representing the classical Centralised finance model, are the main reasons for a person to be unbanked. Unbanked people typically pay for regular products in cash, which paradoxically is everything but not an example of control, which is aimed by the centralised model of finance ad banking system. Furthermore, people who have no access to a bank typically do not have insurance and cannot get pensions or any other kind of money-related service (Acuant, 2020).

Being unbanked can be a problem for many reasons. One of the main reasons is that the unbanked most often rely on alternative financial services, just like cash-checking services and payday loans, which are far more costly and not controlled by systems that assure transparency, trust, and efficiency. Moreover, there is no reliability in giving credits to these people from credit institutions. So when it comes time to cover an auto repair or medical bill, a personal loan might be their only option. These additional costs seriously harm families already struggling to make ends meet.

Globally, around two billion people are estimated to be unbanked, which cast access to financial services. We just need to look at some basic statistics to instantly understand how absurd it is if we compare the access they have to the internet, the only condition to be part of a Decentralised System of Finance and trading cryptocurrencies as a commodity. Indeed, in a country like Moldova, 43.8% of people are estimated to have access to banks, but, at the same time, 108.0% are estimated to be the mobile phone connections; in Tunisia, only 36.9% of people have acmes to the bank, but there is an estimation of 151.0% of mobile phone connections. So this makes us understand the potential that Blockchain technology through cryptocurrencies in a Decentralised Finance could have to help that part of the population who has no access to banks and is seriously penalised (Acuant, 2020).

Chapter 4
Can Cryptocurrencies be the Best Solution for the Unbanked Population?

After carefully analyzing the system behind cryptocurrencies from a technical perspective, to say if cryptocurrencies are the best solution for the unbanked, it is fair to compare our solution to the others that aim to “bank the unbanked”.

4.1 Alternative Solutions to Help Unbanked

One of the most claimed strategies to save unbanked is to reduce the barriers that make this part of the population unbanked, such as decreasing components such as account fees, minimum balance requirements, etc. However, these barriers do not exist in a decentralized finance model with cryptocurrencies because decentralized exchanges do not limit people through fees like credit institutions and centralised exchanges do. Moreover, cryptocurrencies do not provide any minimum requirement at all. Therefore, they can be sustained in a peer-to-peer system without intermediates to deal with; that is why the solution would be instant, therefore, more efficiently provided (Raspa, 2022).

Another debated solution for the unbaked is given by reducing the unbanked's dependence on physical branches, limiting people unbanked, particularly due to their less developed location. This would be achieved with fine-tech, which proposed platforms and applications with several technical ways to identify people through biometric data. It is easily deductible that physical branches are not a problem in a decentralized context of finance with digital currencies (Raspa, 2022).

Moreover, people do not have a bank most of the time because they do not put their trust in the bank. Hence, it would be difficult for these people to agree to the terms and conditions needed to get biometrical data. However, this lack of trust would not be there in Decentralised Finance with cryptocurrencies because knowing the identity of a person it is not necessary to execute transactions safely and with transparency on the object of the deal which would be defined by the conditions given through a code written in the smart contract and, as we have reported in paragraph 2.1 of chapter 2, this code would be accessible and immutable (Raspa, 2022).

4.2 Cryptocurrencies: The Best Solution for the Unbanked

In the previous paragraph, we have shown how Decentralised Finance with cryptocurrencies faces much more efficiently and effectively the solutions provided by banks for the unbanked, which want to introduce fine-tech and reduce barriers limiting people who have no access to reliable commercial banks. Furthermore, the strength of cryptocurrencies is characterised by three vital aspects for providing financial services daily. These components are safety, efficiency, and stability.

Cryptocurrencies are safe because they are sustained by Blockchain Technology which is almost impossible to hack. Furthermore, cryptocurrencies are efficient because they can be provided instantaneously without any intermediates.

Moreover, even if cryptocurrencies have a bad reputation for enhancing a stable value, thanks to Decentralised Finance, we have seen how not volatile and stable the value of several Stablecoins is. Indeed, in a scheme where cryptocurrencies are accepted for everyday transactions, any unbanked person simply with a mobile phone and access to the internet would have the opportunity to open their account, borrowing the first amount of cryptocurrencies, likely stablecoins, and start living a better life. The application of digital currencies to everyday life would be just a natural and inevitable consequence caused by this unstoppable digital revolution. Indeed, it is wasteful to create resources to stop this because the unbanked would drastically decrease their consumption and, therefore, the GDP. Moreover, if the unbanked remain unbanked, the disparity between people would increase, leading to several social problems.

With a full understanding of what blockchain technology is, smart contracts, the role of Decentralised Finance, and how stable can become the value of a digital currency, we can predict a scenario in which unbanked population takes advantage.

We can predict a scenario in which a person unbanked, simply with an internet connection, can finally use cryptocurrencies as a commodity because of their safety, efficiency, and stability. We can predict a scenario in which a person unbanked has no problem lending and borrowing money if they are in an emergency. We can predict a scenario with less disparity among people with less disparity among locations. Finally, we can imagine a world where governments and the whole centralised financial system will take advantage of Decentralised Finance tools to save the unbanked from their hard times.

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