

Abdelmounim El harchy

**THE ADOPTION OF CRYPTOCURRENCIES
AS A BITCOIN ON THE WORLD
PUBLIC ECONOMY**

Master of Science Thesis
Faculty of Management and Business
Examiners:
Hannu Laurilla, Ferruccio Ponzano
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ABSTRACT

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Master of Science Thesis

Tampere University and University of Eastern Piedmont

October 2022

Bitcoin along with other cryptocurrencies have gained much prominence in recent years, in fact, for one reason or another it is on everyone's lips.

Whether positive or negative, most people recognise that cryptocurrencies, especially bitcoin, will revolutionise the public monetary system in the future. In fact, the thinking is that it will once and for all replace cash controlled by central banks such as the Federal Reserve and the European Central Bank.

Bitcoin, the first cryptocurrency in existence, created by Satoshi Nakamoto, also introduced a new technology, called Blockchain.

The entire Bitcoin system, as well as other cryptocurrencies, are underpinned by blockchain technology, which makes it possible for them to be decentralised and thus not depend on any financial authority to function.

There are different types of decentralisation, but these will be explored in more detail within this manuscript.

The rise of cryptocurrencies in recent years has led to their soaring market value in a short time, which is why so many people have seen the possibility of investing their money mainly for two reasons, the first being immediate short-term gain, and the second being gain given over the long term, by trusting the projects behind the various cryptocurrencies.

The research carried out for this thesis cannot and will never be complete, as the world of cryptocurrencies is constantly revolutionizing itself by implementing more and more innovations.

Due to the continuous rise in value of cryptocurrencies, many people firmly believe that they will one day be able to replace the current monetary system in the not too distant future.

In this thesis, cryptocurrencies and Blockchain technology will be introduced, especially that of Bitcoin, being the most important and the one with the most expectations; some countries that have already approved the use of cryptocurrencies within their territories will be analyzed to understand whether an adoption of a single global cryptocurrency is feasible nowadays or not; the environmental impact due to the high consumption of energy required for the maintenance and mining of cryptocurrencies, and finally, the answers to the questionnaire given to economics students at the University of Tampere in Finland and the University of Eastern Piedmont in Italy will be analyzed to find out what opinions and knowledge people have in general on this topic and whether they would be willing to accept cryptocurrencies as an official currency in their countries.

The originality of this thesis has been checked by the Turnitin OriginalityCheck service.

PREFACE

The thesis was developed and written during the last 4-5 months of university. I would like to thank my family first of all, and then my colleagues for supporting me during the two years spent in the master's degree both in Italy and in Finland. In particular, I want to express my gratitude to my supervisors the Professor Hannu Laurilla and the Professor Ferruccio Ponzano for guiding me through the thesis writing process.

I would also like to thank my colleagues from the University of Eastern Piedmont and the University of Tampere for taking the time to participate in the survey and for providing valuable feedback.

Alessandria (Italy), 14 October 2022

Abdelmounim El harchy

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INTRODUCTION

Technological progress has reached unimaginable levels, a few years ago it was impossible to even think of all that there is today.

No one would ever have imagined that a person would spend a good deal of his or her time attached to a square device that projects images and videos, that one could communicate via text or video calls with any person on the globe, or the possibility of being able to make electronic payments just with the help of an electronic card that allows one to have a large sum of money at one's disposal without actually having to physically carry it.

Using the card issued by banks or other financial institutions inevitably means having to trust the system, as all sensitive data will be requested in order to open a current account and entrust your money.

Trusting the system also means accepting that one can expose oneself to the risks that customers' data and current accounts, if not adequately protected, could be misappropriated, or sensitive data could be stolen, disclosed or resold on the black market.

At the beginning when this system was introduced there were many loopholes to be fixed, but with time, thanks to the advancement of technology, updates have been made that manage to guarantee a good level of security, but do not guarantee total protection in the event of an attack by very skilled hackers.

Even today, there are sceptics who do not trust banks with their money and prefer to make purchases in person. Obviously, in this way, one can solve problems concerning the disclosure of data, but one runs into other risks in which one is not protected, such as fraud and theft. These people are generally older people who have not been used to dealing with technology and this system brings huge disadvantages because if one spends money in cash, this is not traced, in case of fraud the evidence cannot be proven as it is not recorded anywhere.

The foundation on which every economy is based is trust, it is at the centre of everything.

Trust is an essential element, especially when it comes to new things to apply. Paradoxically, in the field of cryptocurrencies trust is not needed, in fact for example the Bitcoin system is "trustless".

Bitcoin, is the world's first cryptocurrency and has led to real innovation within a decade, overturning what until 2009, when Bitcoin was created, were the rules of the financial market. The novelty of this cryptocurrency is that it does not require any financial institution to function and does not require any sensitive customer data, thus guaranteeing anonymity. This last point was and still is a double-edged sword because it is used to carry out illegal transactions. Bitcoin is a decentralised system, which means that users have full control over their finances. Decentralisation is the key that distinguishes Bitcoin from traditional currency.

The system is supported by "nodes", which are the users themselves who also use the platform to perform transactions.

The entire system is designed to guarantee total security, in fact, encryption is used to guarantee data integrity. This does not mean that it cannot be subject to cyber attacks, but that compared to the current banking system, it is practically impossible to hack.

Bitcoin since it was created back in 2009 has captured the interest of many people, which over the years, has always grown more and more, until reaching today's value where a single Bitcoin is worth roughly €20,000.

The increasing use of this cryptocurrency has started to make experts worry about the environmental impact. The motivation is related to the energy resources required to keep the network stable and to be able to mine the various cryptocurrencies.

The technology behind every single cryptocurrency is the blockchain.

Bitcoin uses a blockchain based on Proof-of-Work that guarantees an enormous degree of security but at the same time requires a lot of energy.

The blockchain is the foundation on which this new cryptocurrency practically rests, the real technological breakthrough is the blockchain and not the cryptocurrency itself.

This new technology can be implemented in any sector, from finance to tourism.

In the Bitcoin blockchain, the "miners", i.e. the nodes responsible for mining bitcoins through proof-of-work, have to solve complex calculations and cryptographic problems, and in order to do so they need enormous computing power. These problems can be seen as puzzles and require enormous amounts of energy to solve them.

The more adept the nodes become at solving problems, the more complicated these puzzles become, causing an ever-increasing use of electricity.

The purpose of this paper is to seek an insight into the functioning and eventual adoption of cryptocurrencies in today's economic system by focusing the analysis on the bitcoin cryptocurrency and the technology revolving around it.

Data will also be collected through a questionnaire administered to economics students at the University of Eastern Piedmont and the University of Tampere.

The questionnaire will be used to find out whether people believe in bitcoin technology and whether they would be willing to accept a monetary revolution by introducing this cryptocurrency with all its advantages and disadvantages.

Specifically, this thesis will be organised as follows:

- The first chapter will focus on the introduction of blockchain, analysing this new technology and how it can be used in every sector besides cryptocurrencies, analysing the advantages and the disadvantages given by this new technology.
- The second chapter will analyse cryptocurrencies, with a focus on the Bitcoin system and its cryptocurrency.
- The third chapter will be devoted to the biggest negative aspect that cryptocurrencies have, the environmental impact given by energy consumption.

- In the fourth chapter, Venezuela, Ukraine and the United Arab Emirates will be analyzed. All three are pro crypto countries, but they live in a very different situation that will be explored in the chapter in question.
- The fifth chapter will be devoted to exchange rates, the appreciation and depreciation of a currency, and how there is a clear distinction in purchasing power between less affluent and more affluent countries. In addition, will be analyzed the Bitcoin adoption and public economy effects and how could be adopted in the future.
- The sixth chapter will be devoted to analyzing the questionnaire answers from the economic students from Tampere University and the University of Eastern Piedmont.
- The last chapter will be dedicated to the conclusion of the thesis with which we will try to reach a conclusion

1. BLOCKCHAIN

1.1 Traditional system

The blockchain is the basis of the cryptocurrency 'Bitcoin' created back in 2008 by the anonymous inventor known as Satoshi Nakamoto.

At the same time, the blockchain was created, i.e. a registry where all transactions made by the cryptocurrency since its inception are recorded.

At first glance, “that simple definition won’t excite people and will leave many people thinking “ So what? All that hype for a new type of database?” (Gates M. 2017), nothing that exceptional, but to equate “blockchain a new type of database is like saying email is a new way of sending people letters.” (Gates M. 2017)

When a value or transaction is saved in a database, people rely on third parties such as companies, banks and governments. (Gates M. 2017). These are in charge of recording this information and people trust that they are acting transparently, thus not stealing anything. Total trust in short.

People also feel safer entrusting their savings to entities that have the backing of the government, as the common thought is that since their money enjoys government security, it cannot be touched by anyone.

Thus, at the basis of the monetary system, there is trust, in fact, if a person pays cash for a product in a shop, the retailer trusts that that piece of paper with a number on it, commonly called a banknote, guaranteed by the government, can be used in another shop or deposited in a bank without any problems, as he is sure that the value is recognised by all. (Gates M. 2017)

“People trust these external institutions (Gates M. 2017), such as banks and finance companies, to take care of their money and information, such as credit card data, balances and their transactions. In turn, “banks trust that the governments have database and records of notes issued”. (Gates M. 2017)

Trust, therefore, is not only about the financial aspect, but concerns every aspect of human life, e.g. if a person decides to borrow a video game from an arcade (when one still could), the video game is registered in the shop's database. The arcade has a database of its members, all the games borrowed and the expiry date of each loan and all games beyond the expiry date.

The database also contains people's sensitive data, such as home address, gender, date of birth and other sensitive information.

If the game is not returned by the deadline, one may face a fine and possibly go to court, with the aim of being able to repossess the good.

Obviously, what has just been given is a trivial example, but it is necessary in order to understand that sensitive information can be used not only to ensure a certain security for people, but can also be used against them.

In this case, we speak of centralised information, i.e. each institution manages its own system with the help of its own data.

Try to imagine all the scenarios just described above, but without the centralised institutions involved in the transactions. As mentioned earlier, trust is at the basis of everything, it is the foundation that underpins the economic/financial system, otherwise people would not entrust their money to third parties.

Returning to the scenario in which there are no centralised institutions, imagine a shop in which the seller receives a piece of paper with 50€ signed by the customer, as a form of payment, for the purchase of a good or service. The customer guarantees that the piece of paper is worth 50€ and can be used in another shop. The first reaction is not to trust, as no one can guarantee the shopkeeper that that piece of paper is actually worth 50€. Paradoxically, this situation is the same as with banknotes, but one trusts that the shopkeepers will accept the banknote as a counterpart and in turn the shopkeepers trust that it will be accepted by the suppliers. All this because the value is guaranteed by the government itself.

Obviously, the shopkeeper will not be able to accept the piece of paper with 50€ written on it, as he does not place any trust in the customer and no one can guarantee him that it is actually worth 50€.

The fact that today's currency is managed and guaranteed by centralised institutions does not guarantee that there is no risk of default or bankruptcy.

1.2 Historical events

Collapse of economies have already happened, just think of the autumn of 2008, when due to a real estate crisis caused by sub-prime credits, there was a global financial crisis, which started in the US and then spread to Europe and the rest of the world.

According to balance magazine "The 2008 financial crisis was the worst economic disaster since the Great Depression of 1929." (Amadeo K, 2020)

The bursting of this bubble caused the bankruptcy of one of the world's largest banks, Lehman Brothers, sending millions of US citizens into ruin, losing all their life savings.

This chart details the events that led one of the largest banks in America and the world to fail. The common thought was "Too big to fail" (Ferguson D., 2018), that was the thought of everyone, employees, managers and investors who works there, even people did not expect it. "The fact that Lehman Brothers was allowed to enter bankruptcy by the US Government meant the idea that banks were 'too big to fail' was now proven to be untrue. " (Ferguson D., 2018)

A similar event, this time in Europe, happened in Greece in 2015, in fact the banks at that time, due to heavy debts, froze the current accounts of their customers, giving them the possibility to withdraw only 60€ per day. The magazine Insider reports "People are technically only allowed to withdraw just €60 (£42.30, \$66.40) a day from banks." (Brinded L., 2015)

Greece had defaulted on \$1.7 billion to the International Monetary Fund, hence the heavy limits imposed on banks with regard to withdrawing money at the counter.

The question arises at this point, if the governments, banks and financial institutions of the world's most powerful states can collapse, in whom or what should people entrust their money? As for the less developed countries, where people have no trust in government whatsoever, where should they deposit their assets?

The answers to these questions are not simple; with each solution comes a new problem to solve.

The key is to be able to find a solution that has as little negative impact as possible.

The trust, as mentioned earlier, is the basis of everything. There are millions of people living in states ruled by monarchies or dictatorships, where governments control banks and seize money directly from their citizens' bank accounts without any consent.

Many governments use their means not only to steal from citizens' accounts, but also to spy on or arrest people who have made certain financial transactions.

A glaring example is North Korea, the country is isolated from the rest of the world and any form of expression from foreign countries is strictly forbidden, on pain of imprisonment in labour camps where people are no longer considered human beings, but merely objects.

In these countries, "there is a lack of trust in companies and governments, it make transactions risky and difficult". (Gates M. 2017). If people put their money in a bank, the bank might steal it from them, whereas if they keep their cash at home, there is a risk that someone else will steal it from them or that it will be destroyed in an accident, for example by being burnt in a fire. (Gates M. 2017)

According to Gates Mark he problem with using cash is, assuming one can buy a house for cash, there is a risk that the seller will run away with the money without ever having transferred ownership of the property, as the money used in the transaction was not traced. (Gates M. 2017)

Centralised databases, therefore, work if there is "trust in system of law, regulations, government, finance, and people" (Gates M. 2017), whereas decentralised databases, thus based on Blockchain, eliminate the need for intermediary institutions.

1.3 Blockchain

Within the blockchain, everyone can view and validate transactions, with the aim of creating transparency and trust.

If trust is a key aspect for the functioning of the financial economic system in the centralised system, in the blockchain, trust is the key element for the functioning of this technology.

"With blockchain, we can imagine a world in which contracts are embedded in digital code and stored in transparent, shared databases, where they are protected from deletion, tampering, and revision." (Iansiti M. and Karim R. Lakhani, 2017)

"The first reference to blockchain was within the source code of Bitcoin". (Gates M. 2017)

In a nutshell, the blockchain was created the moment the first Bitcoin was created.

According to Gates Bitcoin was not only created thanks to the blockchain, but also thanks to several cryptographic technologies combined.

The blockchain is mainly used in cryptocurrency transactions, but it is only one of the infinite uses of the blockchain, but for now it is still an almost totally unexplored technology.

Like all big changes, there is always a period of uncertainty, of fear, which leads people not to believe in change or to choose not to take risks for fear of losing everything, the so-called 'comfort zone'.

Blockchain technology can be used, for instance, in different applications in different industries, in the storage of data in the cloud and in digital identities. In fact, some states are already trying to implement blockchain in the various systems and services offered to their citizens.

The famous article The Economist reports the story of this woman Mariana Catalina and how the current data storage system has created many problems for her. The article reports 'Mariana Catalina Izaguirre had lived in her lowly house for three decades... the country's Property Institute showed another person registered as its owner, too-and that person convinced a judge to sign an eviction order. By the time the legal confusion was finally sorted out, Ms Izaguirre's house had been demolished. (The Economist, 2015)

Unfortunately, these situations are not new and that is why many people strongly believe in blockchain technology, as being immutable would have prevented situations like this.

There are 3 different types of blockchain:

- "Open type (permissionless) or public, allows to become a miner or node to an unlimited number of people, no registration or revocation of authority is required;" (Mesengiser Y. and Miloslavskaya N., 2020)

Users who are connected to the blockchain in question have no privilege over others, they are all on the same level. The protocols that determine its operation cannot be altered or modified without the consent of the majority of the people connected to the network itself.

The public blockchain is used by Bitcoin and in this thesis, this type of blockchain will be analysed. Furthermore, this blockchain increases the stability of the system as the number of nodes increases, making it more secure.

- "Closed type (permssioned) or private or corporate, restricts the circle of miners and nodes outside the community, registration is required for participation, when leaving the community, the access right is revoked" (Mesengiser Y. and Miloslavskaya N., 2020)

This type of blockchain goes against the purpose for which this technology was created, i.e. to be decentralised, but because of its characteristics, it is considered to be more secure than public, as the data is only visible to its members.

- "Mixed-type or hybrid - an open-type blockchain that uses closed-type platform building technologies to achieve consensus". (Mesengiser Y. and Miloslavskaya N., 2020)

This blockchain shares many points with the closed type. It is centralised, it needs the consent of the authority running it to enter, and in addition, the authority has the power to change the transactions and the rules of the blockchain itself.

When one speaks of a centralised database, one can imagine a person standing in front of a computer and manually entering people's data into a database and this data cannot be visible to other people.

In a decentralised database, on the other hand, all people have access to the data within the database, not just a limited number of people. The data is thus visible and transparent to everyone.

In the example of the video game borrowed from the arcade, in the previous chapter, all the data in the database, if it were decentralised, would be available to all users and whenever the game was returned to the shop and lent out again, the data would be updated in real time. There is no central database and no need for any institution to manage the system, because everyone contributes.

1.4 Origin of the name blockchain

In the arcade example, every time the video game is lent, a transaction is created. There are many transactions taking place at the same time, so these are grouped together in a new block.

Transactions generate blocks that are placed one on top of the other depending on when these transactions take place. Then the “new block is added “on top” of the previous block by referring to the block before linking them together”. (Gates M. 2017)



1.1 How the blockchain works

In this image, you can see how block 2 is connected to block 1, which in turn is connected to block 0. The security behind blockchain technology is precisely this, the fact that the blocks are interconnected and therefore even a minimal change to one block would be almost impossible, as one would have to change the entire chain.

The connection of these blocks is called a chain. In the arcade example, users can therefore see all the video games that have been borrowed, and by whom.

They can see previous transactions by tracing them back to the original owner.

Since it is not regulated by any central authority, if a person claims to have been or to be the owner of the video game in question, all one has to do is go backwards from the last block of transactions to the first to verify the veracity of the claim.

1.5 Modifying blockchain blocks

According to Gates Mark, blocks, once added cannot be modified or changed, they remain permanently in the blockchain's history.

Since each block is in turn connected to two previous blocks, if a hacker wants to commit a scam by trying to change a transaction, he will have to change all the previous blocks from the source and then change the current block, but in the process he will have added other blocks connected to the block he wants to change.

Experts in the field have estimated that after an addition of 6 blocks above the reference block, it becomes practically impossible to change the nature of the block, as the computing power would become impossible to sustain.

Therefore, if the goal is to change the transaction in block 20 and the blockchain reaches block 26, it becomes impossible to do anything, plus there is the fact that 6 transactions are very easy to reach, which means that the hacker in question would have to change the transaction at the very moment it is made, otherwise it will be too late.

Knowing this, many companies that use cryptocurrencies to make payments wait until they have six confirmations before accepting a payment, to ensure that this is not changed on the blockchain.

To better understand how the blockchain works, imagine again the arcade that rents video games to its customers. Each time a game is borrowed, a transaction is created and this transaction is sent into the network to be validated and added to the blockchain. The people, connected to the arcade's blockchain network, who are in charge of validating or not validating the transaction, are randomly taken and checking that everything is in order, then, that the transaction respects the canons dictated by the blockchain, they add it into the network and get a reward.

The new block is added to the blockchain and the data is updated. Everyone in the network can go and check the status of the video game, i.e. whether it is still on loan or has been returned to the shop.

1.6 Distributed consent

The consent and subsequent registration of the transaction takes place through the approval of outsiders whose task is to verify and register the transaction within the blockchain.

According to Gates, this happens when the majority of people, connected on the network, must agree and approve the transaction, hence the decentralisation. As it turns out, there is no single body that approves transactions, but approval comes from randomly chosen people

in the system. To do this, people receive a reward for each transaction they validate and put on the block.

Of course, it is not possible that everyone in the network will always agree, because there are and always will be people who will try to cheat the system in order to validate fake transactions.

With many blockchains, the consensus threshold is said to be 50%, if 51% of the people in the network agree on the validity of the transaction, it will be entered into the blockchain.

Before approving a transaction, the people in the network can verify the details of the transaction, check whether the amounts are actually correct or invented for the purpose of scamming people. All this information can be found thanks to the blockchain network, which makes it possible to verify all transactions and trace them back to the original owner, or to check whether the offer made by the customer is real or just an attempt at fraud.

The 51% approval system is a safe system, but can lead to potential risks and dangers if an invalid transaction is approved.

1.7 Blockchain and Bitcoin

The blockchain was first created with the creation of Bitcoin.

A distinction must be made between Bitcoin written with a capital letter and bitcoin written with a small letter.

When in magazines or in the news, it says Bitcoin, it refers to the Bitcoin system as the technology, hence, the blockchain network of which the cryptocurrency is a part, and the cryptocurrency itself; whereas by bitcoin, it refers only to the cryptocurrency.

At the heart of cryptocurrency is blockchain technology. At the basis of blockchain is cryptography, which in the history of mankind has always been used to protect secrets or sensitive data that in the hands of the enemy could be a dangerous weapon.

“Cryptography is the key underlying foundation of the blockchain... A famous example of ancient cryptography was the 'Caesar's cipher', used by Julius Caesar when he sent written communication containing sensitive information.” (Gates M. 2017)

Modern cryptography is obviously quite different, it has evolved over time, but the principle remains the same. Messages, data and files are hidden with the help of numbers that may seem random at first glance, but with the right key it is possible to decipher them.

Technology has taken cryptography to unimaginable levels, for without a computer or tool to help decipher the message, human knowledge alone would not be enough to solve the puzzle.

1.8 Advantages

Like everything in life, there are pros and cons to new discoveries, nothing is perfect. Here we will analyze the individual positive impacts given by the use of the blockchain.

According to Gates, the positive aspects of using the public blockchain are: decentralisation, absence of intermediaries, a wide range of uses, transparency, security, trust, reliable technology, speed of transactions and reduced costs. (Gates M. 2017)

1. Decentralisation

Decentralisation is at the heart of blockchain technology, hence of any cryptocurrency for that matter. It is the key to eliminating intermediaries during a transaction.

By using blockchain, companies do not have to leave control of their transactions to a single institution, but instead use a single ledger, managed by a large number of connected people around the world.

An example could be given to explain the situation, taken from the book of Gates, is to imagine a transfer of money between a group of banks. Under the current system, the banks would record the transaction in their books. This means that each bank would keep records of its own transactions. With this, one would have to ask to see the registers of the banks involved in the transaction in order to verify whether the transaction actually took place. (Gates M. 2017)

By using a ledger on the blockchain, since it is a single ledger that can be consulted by all users, should one wish to verify some transaction made by, for example, bank X, all one has to do is search for the transaction as the banks have synchronised the ledger in question.

In fact “the decentralisation structure... is an advantage to companies”. (Gates M. 2017)

For Gates, competing companies will not want to put their data in a database managed by a competitor or an individual company, as the company will have to use complex legal contracts and confidentiality agreements to protect its privacy.

Paradoxically, companies will be more willing to put their data in a blockchain-based database where competitors can work together as everyone has access to all information, thus spurring companies to be more efficient.

Blockchain technology, being decentralised, is much more secure and less prone to hacking by malicious parties. Hackers have no fixed point to attack, because there is not a central database, , in fact, all computers connected in the blockchain network are headquartered or servers, and furthermore, all computers connected to the blockchain network have a copy of the blockchain, so even if a hacking attack occurred, it could be defeated by deleting and restoring the entire network without, therefore, losing any data.

A possible hacking attack could only 'succeed' if more than 50% of the computers connected at the same time to the entire blockchain network were to be hacked. Needless to say, this is practically impossible.

2. Absence of intermediaries

As already mentioned above, today's transactions with normal currencies (euros, dollars, pounds sterling, etc.) need intermediaries such as banks and other financial systems in order to function. The 'Visa' or 'MasterCard' systems have the task of verifying the security of transactions and thus guaranteeing the trust placed in them by customers.

This payment system is obviously centralised, meaning that there is someone who decides whether or not to approve transactions.

A very recent example is that of Russia, which, due to the war in the Ukraine, was issued heavy sanctions that also led to the freezing of its 'Visa' payment system, cutting it off from any trade with other countries.

Obviously Russia reacted in its own way against these sanctions, but it is a very good example to show how few states have control over global transactions.

With the use of cryptocurrencies and thus blockchain technology, the middleman no longer exists, the transaction is carried out directly between the parties involved.

This technology therefore brings enormous benefit to billions of people around the world who live in countries where they cannot trust third-party intermediaries due to, for example, corrupt, unstable governments with high crime rates, or undeveloped countries that use paper-based, non-digitalised records.

Also, "Blockchain provides trust and transparency while reducing the risks involved in transactions". (Gates M. 2017)

3. A wide range of uses

"Anything that has 'value' can be recorded on the blockchain" (Gates M. 2017). By value, we do not only mean value in the monetary sense, but also intrinsic value, such as the sensitive data of a company or of individuals.

Blockchain technology is a new and easily accessible technology, especially thanks to recent innovations such as the Ethereum platform and smart contracts.

The Ethereum platform enables the development of applications or projects using blockchain technology.

Every sector in the world can be incorporated into the blockchain, e.i. in the shipping industry.

"The processes involving international shipments of goods by sea are complex since they involve a large number of organisations and people, including a network of shippers..

Blockchainbased smart contract will have a significant role in the Maersk platform as it enables managing approvals, faster processing of information compared to the current system, and the number of errors will be reduced to zero." (Jovic M., Filipovic M., Tijan E, Jardas M., 2019)

4. Transparency

As mentioned earlier, blockchain technology offers total transparency. The changes that are made are immediately visible to users who have access to all the necessary information.

Once information has become part of the blockchain, it can no longer be deleted or changed. With existing databases, it is possible for a person to alter information, in fact, there have been many examples of fraud that were never discovered or discovered years later when it was already too late.

Because of this, many people have managed to get away with stealing both money and entire identities from honest citizens.

Blockchain technology, due to the fact that each block is linked with 2 previous blocks, makes it impossible to manipulate or delete data or transactions.

All changes that are made occur in real time and the process only continues when “transactions are approved and added to the blockchain”. (Gates M., 2017)

Therefore, a company, which has its data recorded within a blockchain database, which would like to cover a balance sheet loss in order to make it appear to be in profit, by falsifying the data, inflating the profit for the year, is very unlikely to succeed, compared to a company which does not use blockchain technology as a database, but normal records.

5. Security

The data on the blockchain is immutable, which means that it cannot be modified or changed. Every block of data on the blockchain can... be traced back to the first ‘genesis block’” (Gates M., 2017), i.e., the packet of data that gave birth to that database, in other words, the parent transaction or primary data.

The immutability of the data, coupled with the fact that it is possible to trace a path backwards to the 'genesis block', makes it possible to reconstruct a clear and linear path in order to verify that the information is correct and true.

As already mentioned, the only way to be able to change information within the blockchain network is to take control, at the same time, of more than 50% of the computers connected to the network. We are talking about millions or billions of connected computers in the world that simultaneously have the task of keeping the blockchain network stable.

Of course nothing is perfect, there are some shortcomings, but it is nothing compared to the security systems used today. The blockchain cannot guarantee 100% protection from fraud, but at least it is a very effective tool for flushing out those who attempt to hack the system or who try to incorporate bogus transactions into the network.

6. Trust

The absence of third parties in the transaction reduces the risk of being defrauded by an intermediary in bad faith.

The blockchain, by not including them, ensures the trust and security of the transaction between the parties involved, who can monitor the transaction very easily without having to wait days or hours, all of which can be done in a matter of minutes or even seconds.

Confidence is what underpins the entire global economic system. In the absence of confidence, people begin to save and stop investing, leading in many cases to dark periods of recession.

The transparency and direct contact with the counterparty in the transaction makes the blockchain system very valuable in terms of trust.

In fact, it is advantageous for both parties to register transactions on the blockchain. For those who do the transaction, they have the advantage of doing it in a short time, with very low fees; for those who verify and validate it and add it to the blockchain, they have a profit.

If the person chosen to verify the transaction considers the transaction to be compliant and adds it to the block, but it turns out later that it is not compliant, the person who verified it is banned and is no longer considered for any new transaction verifications, so he or she would lose the gains he or she could have made by verifying and approving new transactions.

7. Speed of transactions

According to Gates, a monetary transaction made through the blockchain is recorded in real time and can be visualised immediately. The absence of intermediaries helps the speed of data transmission, in fact, for example, making a normal bank transfer, the money sent will show up in the bank account of the counterparty after days, or after hours in the case of an instant transfer, but one has to pay more as it is recognised as a plus service.

Using the blockchain, i.e. cryptocurrencies, transactions take place instantly and the movement of money is recorded after a few seconds within the blockchain database, and can be viewed by all people.

Obviously, blockchain technology, as mentioned earlier, can be used in all fields, so the speed of data transmission is not only in the monetary sphere, but also data packages weighing many gigabits that need to be transferred from one side to the other.

8. Reduced costs

Blockchain technology can reduce costs significantly in many areas, in fact, by removing the intermediaries that are involved during transactions, it is possible to save a lot of money.

The maintenance of the various databases is very expensive and above all inefficient, because in the event of an accident, all data is at risk of being lost. With the blockchain system, every computer connected to the network has a copy of the blockchain database, so even in the event of an accident, there is always the possibility of recovering lost data.

1.9 Disadvantages

The blockchain was designed to solve the problems of centralising transactions and at the same time guarantee transparency and veracity of data.

Every day, start-ups are born based on this technology that promise to solve any existing problem with the help of cryptocurrencies and the application of blockchain.

This had already happened with the advent of the Internet in the early days, in fact, there were many people and young companies promising the world, without actually having anything in their hand. In Gates' book, reference is made to the beginnings of the internet, he Internet, companies and people who believed in this technology, promised the world, but the promises that were made during its launch were unrealistic both in terms of timing and the technology that was available at the time.

Every innovation that goes to solve a problem, in turn brings other problems to be solved.

According to Gates, the disadvantages of blockchain are:

1. Lack of privacy

Transparency, a positive quality that characterises this technology, is at the same time a negative quality. Decentralisation leads to an absence of privacy, in fact, "not only the information not private, but it also readily accessible at any given moment to anyone using the system". (Gates M, 2017)

Tracing the person who, for instance, has made a monetary transaction through a cryptocurrency is relatively easy.

The information that third parties outside the transaction could trace is very confidential. A person who makes a transaction in a shop on the blockchain, releases sensitive information that everyone can see, in fact, for example, the shopkeeper can trace the wallet from which the funds were sent, could check the balance of that wallet and view the incoming and outgoing transactions in real time.

This situation worries many people who rightly want to have total privacy, at least as far as sensitive information is concerned.

Intruders could trace the identity of the person owning the wallet and clone identities to resale on the dark web.

According to Gates, the most worrying fact is that computers connected to the blockchain network are located in countries such as Russia and China, where cybercrime and personal information can be used against people living or travelling in those countries. (Gates M, 2017)

There are, however, blockchains that provide greater privacy in transactions such as authorised and private blockchains, which, being centralised, limit the number of people who can access the information, but the most popular cryptocurrencies, such as Ethereum and Bitcoin, use a public blockchain, and for now the network does not want to implement any restrictions on the information that can be viewed.

2. Decentralisation

The strong point of this technology is at the same time its weak point. Centralised systems, therefore with an intermediary in the middle of the transactions, do not exist in decentralised systems, and therefore the task of guaranteeing the security, the veracity of the transaction falls directly on the parties involved in the transaction.

Control of the transaction, in the blockchain, is given to the majority of the people who are connected to the network at that exact moment.

When we talk about decentralisation, we mean that most of the actors connected to a blockchain network have to agree on the future direction of the operation.

In a company, if you want to implement a change, you can only do so after obtaining approval of the relevant plans of the company, so it happens in the blockchain network, changes to be accepted must have a majority of the network. This majority “may be over 50%, 70% or even 80%” (Gates M, 2017), which is very rare.

Technology changes very fast and needs an efficient decision-making body, decentralisation with different approval rates can hinder the innovation process and in the long run become counterproductive or even an obstacle for innovation.

Companies do not yet implement blockchain technology precisely because it would put the power to approve or reject changes and thus control the future of the company in the hands of outsiders.

The discourse changes if the company uses the blockchain privately or by authorisation, but the transparency of the data would be lost since users must be invited by the authority operating the network in question in order to view the information, plus in the case of the private one, the authority can change the data recorded in the blockchain.

3. Attack at 51%

If one person, highly unlikely, had control of more than 50 per cent of the blockchain network, they could control all transactions taking place in that network. This casuistry is dubbed a 51% attack. In this case, the attacker has the power to block the confirmation of new transactions and allow 'double spending'.

The problem of double spending occurs when a user uses the same currency to make 2 different purchases. The miners verifying the transactions will only add one of the two transactions because, if the first one is recorded, the money in the user's wallet will be immediately deducted and therefore when one goes to confirm the second transaction, it will fail because there will not be sufficient funds to continue with the transaction.

In countries such as China and Russia, there are these notorious 'mining farms' that control a great deal of computing power and, according to Gates, if one day they decided to collaborate, they could, again theoretically, control and manipulate blockchain networks.

Even without actually controlling 51% of the blockchain network, they can still influence the network's performance, bringing their computing power to bear by strategically placing themselves in blockchain networks with fewer restrictions.

4. Cost

Cost is an element that we also find in the advantages of blockchain, the absence of the third-party intermediary in transactions is a very important component and one that saves cost (given the high bank fees) and time.

On the other hand, however, costs rise when it comes to the energy used to run the blockchain network.

Adding a block of data to the network involves solving complex calculations made by computers built specifically to solve these humanly impossible equations.

In practice, these calculations are puzzles that have to be solved through the proof of work algorithm.

The energy consumption required to solve these puzzles is enormous and due to the high cost per kWh in industrialised countries, poorer countries are chosen for the less cost of electricity in order to build the farms to mine bitcoins.

That is why countries like China and Russia have many mining farms, because the cost of electricity in those countries is very low.

The functioning of blockchain networks is supported by these farms, their job is to solve these complex calculations in order to add blocks to the blockchain network.

Each block added to the blockchain network is paid for through bitcoin, hence the term bitcoin mining.

5. Still new technology

Blockchain technology is still a new technology, of course it was born with Bitcoin back in 2008, but until now it has mainly been applied in cryptocurrencies.

Only very few states and companies have begun to open up to this technology, this is because they fundamentally lack the basics and the appropriate knowledge.

The technology itself has a lot of potential, but for now, it is all just theoretical.

There are many benefits, but just as many risks that cannot be solved due to the nature of the blockchain itself, such as the loss of the access key, or the recovery of money stolen or mistakenly sent to the wrong wallet.

6. Problems with recording transactions

Nowadays, blockchain could not replace financial transactions performed with Visa and MasterCard, due to the slow registration within the blockchain network.

For example, Bitcoin transaction takes approximately 10 minutes to add a block to the Bitcoin network and each block contains 20,000 transactions. This means that computers can process an average of 3 transactions per second. (Gates M., 2017)

The Visa and MasterCard circuit can process 20,000 transactions per second, there is practically no competition and the acceptance or rejection of the payment occurs after a few seconds.

With the current blockchain and thus the use of bitcoins, companies for example have to wait at least an hour to confirm that the transaction has gone through, this is because in order to avoid malicious attackers wanting to change the transaction, they have to wait at least another 6 blocks to be added, which makes it impossible to change the transaction on the blockchain. If each block added takes 10 minutes, the addition of 6 blocks will take 60 minutes, the time for the transaction to be permanently confirmed.

As it turns out, the blockchain network is still at an experimental and, above all, developmental stage, In fact, right now, it cannot replace the current method of payment.

Many people believe that in the future the blockchain will be nothing more than an electronic ledger in which the date and time of transactions will be recorded and that it will not actually make any contribution to society, but even before, people thought that e-mail was just a cooler way of sending a registered letter.

7. People's trust and understanding

Most people do not know the real workings of the blockchain, whose reputation is still tarnished by its connection with Bitcoin.

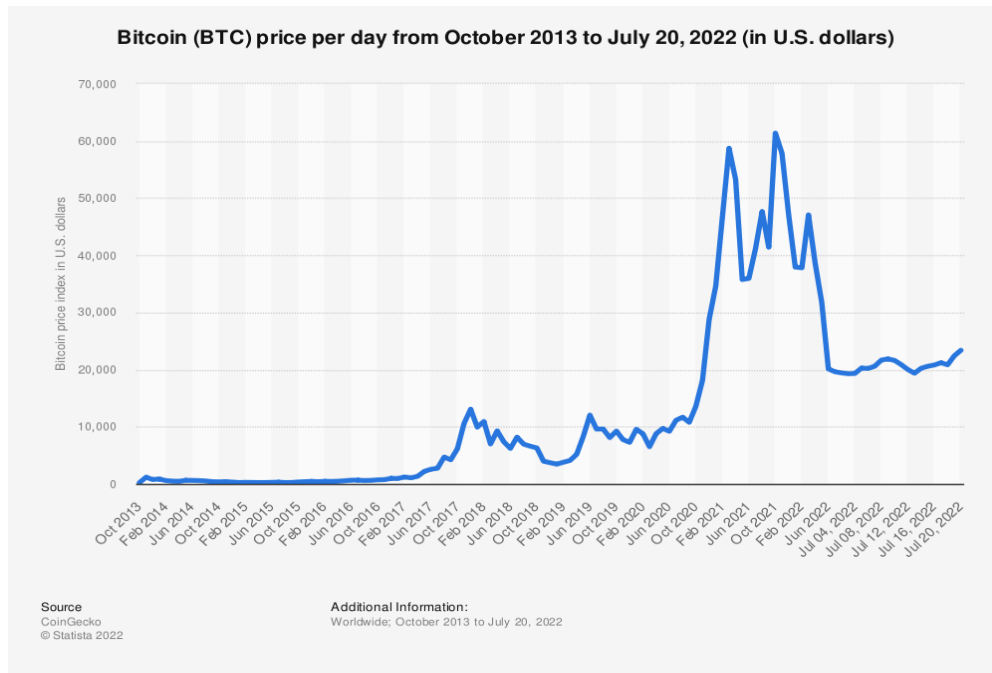
People think that Bitcoin is the real protagonist of this digital evolution, but they do not realise that it is the blockchain that is the real protagonist. Without blockchain there would be no cryptocurrency, but without cryptocurrency there would still be the blockchain network.

Because of the dark past that has connected and still connects Bitcoin with the criminal world, the use of this cryptocurrency is still viewed strangely by many people.

Thanks to the security of transactions provided by the blockchain, many criminals have managed through blackmail, kidnapping or the sale of illegal goods, to get paid through cryptocurrencies, especially bitcoin, which is still considered the cryptocurrency par excellence.

Public trust and understanding will be indispensable to see this technology progress, but because of these events, it may take a long time.

In the past, bitcoin used to be marginalised because of this, but in recent years, due to fashion or pure speculation, the cryptocurrency has boomed in popularity, and its value has skyrocketed, as can be seen in the graph below.



1.2: Bitcoin Growth graphic

8. Enthusiasm

Everything inside the blockchain could be described with too much enthusiasm and perhaps overestimate its real potential, a bit like what happened at the beginning with the advent of the Internet.

Claims such as 'blockchain will change the world', or 'it will wipe out the banks, solve world poverty', are dictated by euphoria, fuelled by the hype given by a novelty that may have real potential, but which do not come close to fulfilling the promises made.

A blockchain-based system can be considered when it offers a better service than the one already in place. Most people do not give confidence without seeing results and human beings are by nature sceptical if they do not see or touch anything concrete.

It is certainly a very interesting technology, but one that still has a long way to go and many problems to solve.

2. BITCOIN AND CRYPTOCURRENCIES

2.1 From barter to money to Bitcoin

Money in our society is what makes exchanges between people possible. Before money there was barter, exchanging one thing for another. Money was coined precisely because it was more convenient to carry.

With the passage of time and the advent of the Internet, new forms of payment came into being, especially the emergence of online transactions through digital money.

Digital money is preferred to traditional, paper money, because it is easily controlled by states, as every transaction is recorded and can therefore be traced in case of need.

This situation seriously calls into question the privacy of people who are constantly monitored. Nations and banks, therefore, are the ones in control of all the money in the world and because of wrong or too risky investments, they have, many times, ruined millions of people by triggering a global economic crisis.

In 2008 during the great economic crisis that started in the US, due to bad investments and subprime mortgages, led to years of recession first in the US and then worldwide, especially in Europe a year later.

Because of this, Satoshi Nakamoto, a pseudonym, created the first Bitcoin cryptocurrency and the Blockchain network that supports this technology.

“Satoshi Nakamoto is the anonymous name used by the creator(s) of the cryptocurrency Bitcoin. Although the name Satoshi Nakamoto is often synonymous with Bitcoin, the actual person that the name represents has never been verified.

Many people to believe that it is a pseudonym for a person with a different identity or a group of people.” (Hayes A., 2022)

Bitcoin is a decentralised monetary system based on blockchain technology.

This currency does not require intermediaries to function, the exchange of money takes place directly between the two players. Bitcoin is “a peer-to-peer electronic cash system” (Coen D., 2019)

This currency unlike real paper money has a limit, in jargon it is said to have a digital scarcity. “Digital goods traveling in the network (bitcoins) are limited like precious materials” (e.g. gold) and cannot be counterfeited. (Coen D., 2019)

“Moreover, they cannot be stopped or seized, because they travel within a decentralized network” (Coen D., 2019) in which there is no decision-making body, but the entire network is supported by the number of people who are connected at that moment in the network itself.

2.2 Digital scarcity

Thanks to the Internet, people are able to communicate with each other wherever they are. When a person wants to transmit messages or multimedia content to other people, all they do is exchange data packets.

A financial transaction, with the help of digital money, necessarily needs a third party figure in the transaction in order to work.

In the world, for example, if a person sends a photo to a friend of his or her, this photo will be broken down into numerous data packets and sent over the Internet to eventually reach the final recipient, who will upload the photo for viewing.

In this way, if the photo was previously in one device, now the same photo has a copy in another device and this can be shared again and again.

In this way, it is no longer considered a scarce good because many people have a copy of the original image.

Bitcoin, through its rules and protocols, manages to solve this problem, because if it is sent to someone, that person becomes for all intents and purposes the sole owner of that asset.

Thus, the Bitcoin system is a decentralised system and at the same time a scarce commodity, unlike traditional currency that uses a centralised system and is not a scarce commodity that can be replicated indefinitely, such as creating or printing new money.

2.3 Centralisation and decentralisation

“Bitcoin is an opensource project” (Coen D., 2019), in the sense that it is in the public domain. According to Coen, an opensource system can be the Linux and Android systems, where it is possible to use these systems as a base and then customise them and make them more personal. The opposite of these systems are, for example, Apple iOS and Microsoft, which do not give the possibility of making changes to the system.

The ownership of Bitcoin therefore belongs to everyone, no one has decision-making power over the system, but it is the people connected to the network who decide unanimously or by majority percentages on what to do.

The peculiarity of being an open source project is that in “Bitcoin: you don’t need to trust the system or who created it. With a little study or a professional, you can analyze the code and make sure it actually does what it was built for...It can be defined as a trustless system.” (Coen D., 2019)

Being opensource, the first question that arises is "where is the profit in using this platform?" The platform can be used to create applications or new programmes that can be offered for sale to customers. Even platforms such as Netflix, Amazon have been built using the Internet platform, which is also opensource.

The people who are part of the network are called nodes, for example in the Meta ecosystem (formerly Facebook), the administrators (admins) choose the changes to be made through

updates and the users (users) are the ones who will use the platform to create content and thus fill it.

For example, Instagram is full of videos and photos that users put up, either for pleasure or to sponsor some product/service, instead, admins provide the tools for users to perform their activities on the platform.



2.1: centralized system and decentralized system

The figure shows a centralised network on the left, and a decentralised network on the right. The difference between the 2 networks will be explained in 2 points.

- Centralised network, all clients (people connected to the network) are connected to one central node, called the server. The server has the task of processing and fulfilling the requests of the connected clients. The risk here is that if the server stopped working, the entire system would go haywire.
- Decentralised network, there is no central server, but each node can in turn be both server and client. In this way, even if a node had any problems, it would not affect the entire network, which would continue to work thanks to the decentralisation of the servers.

2.4 Bitcoin creation, mining, proof of work and the fork

There are 21 million bitcoins in circulation, some already mined and others yet to be mined. It is normally thought that they are produced from nothing and that all that is needed is a computer and a lot of electricity to start the 'mining' process in order to create the bitcoin. Bitcoin, of course, is not generated out of thin air, but with the help of computers that, thanks to their computing power, put new bitcoins into circulation every 10 minutes, so the addition of each block of transactions within the Bitcoin network in turn generates a bitcoin.

If two people, for example, Mr White wants to send money to Miss Red, the transaction starts at Mr White's node and goes to all nodes in the network and is temporarily stored in a Mempool, a temporary memory.

There are nodes, which in addition to verifying transactions within the network and ensuring that the rules imposed by the Bitcoin network are respected, work to transcribe these transactions into the blockchain's ledger, making them irreversible. This activity is called proof of work, which is the system used by the Bitcoin network.

"In Proof-of-Work, each of the miners is involved in solving a computationally complex problem" (Mesengiser Y. , Miloslavskaya N. , 2010)

Then the transaction is parked at the first available node that has the computing power available to solve the puzzle.

It is a kind of competition between the nodes, in that the first to solve and transcribe the transaction in the Bitcoin blockchain will have a bitcoin gain.

If a node finds the solution it provides it to the other nodes who will have the task of proving that the work is correct (proof of work). The other nodes will check that all requirements are met and that all calculations add up, after which they can validate the transaction and record it permanently in the Bitcoin blockchain.

After the transaction is entered into the blockchain, the node that found the solution to the puzzle will be rewarded with the issuance of new bitcoins by the Bitcoin system and will also get paid commissions for the work done.

On average, it takes 10 min on a very powerful computer to solve these puzzles, but this obviously depends on the computational difficulty required to find the solution.

Miners' earnings per block added to the bitcoin blockchain network are decreasing year by year due to both the increase in the value of bitcoin and the fact that the limit of 21 million mined units is slowly being reached.

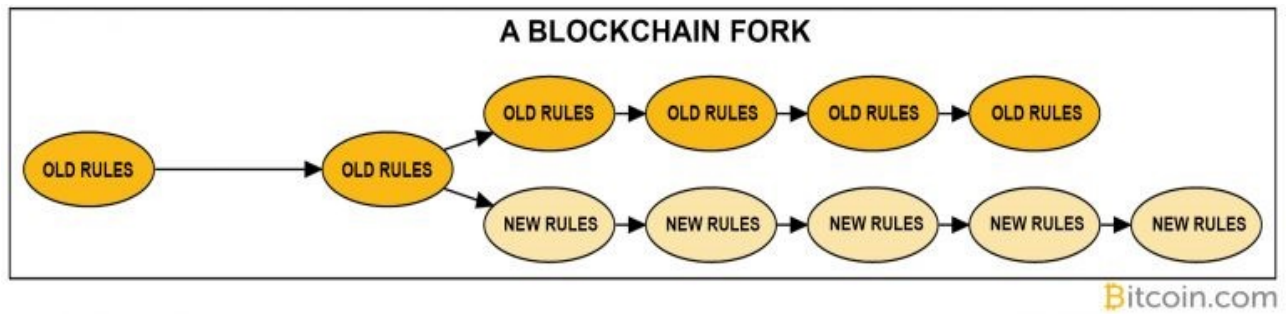
A fork is a temporary inconsistency in the Bitcoin network that resolves itself after a certain number of blocks are added to the system.

The blockchain is a single line formed by blocks of data, but it can happen that there is a bifurcation that can temporarily lead to having 2 lines in the same blockchain.

A bifurcation in this case occurs when a node receives a valid block and adds it to the blockchain and shortly afterwards receives a second valid node from the same original node as the first and adds it to a secondary chain.

The blockchain is split into two branches, but for a short period of time. At this time, therefore, two valid, parallel versions of the same blockchain will exist.

Obviously, no two branches of the same blockchain can coexist, and therefore everything is resolved through the consensus of the nodes that are part of the network itself. Simply, the blockchain that expands the fastest will become the official one and the other will stop expanding and all transactions that have been validated in that branch will either return to the main branch or be discarded.



2.2: Blockchain fork

There are also different types of forks, the hard fork and the soft fork, but which we will not go into here as they are of marginal importance.

2.5 The value of bitcoin, the usage and the storage

The value of each bitcoin is determined by the market, by who buys and who sells. The value is given by the encounter between demand and supply. (Coen D., 2019)

Coen's book gives an example to explain the system well and is the world of auctions.

The true value, therefore, will be established during the auction, the first value is only hypothetical and the real value of the asset, in this case bitcoin, will be established at the time of the last bid.

The place where these auctions take place are the Exchange channels where sellers and buyers meet. Nowadays, there are many Exchanges operating in the cryptocurrency world, such as Binance, Coinbase, eToro and so on.

Those who sell bitcoin propose a price trying to maximise their profit as much as possible, while those who buy have the opposite objective, trying to buy at a price as advantageous as possible.

When supply and demand meet, the price of the cryptocurrency is set.

Volatility is the main factor here, because being an unregulated market, the price is decided solely by the meeting of supply and demand, and it is not uncommon to see fluctuations of thousands of dollars within a single day.

Moreover, being unregulated, there are no set opening or closing times, as with normal exchanges, but it is possible to sell or buy cryptocurrencies at any time of the day, even in the middle of the night.

According to Coen "the value of the single bitcoin can undergo very important variations and for the moment the asset is considered high risk" (Coen D., 2019), because the price tends to fluctuate wildly.

Bitcoins concretely do not exist, in the sense that during a transaction one does not actually exchange bitcoins, but updates the public register of the blockchain that certifies the ownership of the cryptocurrency.

In order to carry out a transaction with bitcoin, or any cryptocurrency for that matter, one must necessarily be in possession of a digital wallet.

Returning to the example given above, the transaction between Mr White and Miss Red, will take place when Mr White writes down an alphanumeric string, which would be a kind of Iban identifying the Wallet, but which is disposable and not permanent like the Iban of current credit cards, with the aim of guaranteeing the privacy and security of the parties in the transaction.

Mr. White, before sending 1 BTC to Miss Red, will have to pay a fee to the miners who will enter the transaction into the Bitcoin blockchain.

The higher the commission, the greater the chances that it will be entered more quickly.

The sender of the money may rightly disagree about paying a commission, since in normal credit card transactions, the sender of the money pays no commission.

In reality, when making a digital payment, using a credit or debit card, the fees are paid by the person receiving the payment, and the percentages vary depending on the bank with which the contract was concluded.

The difference with the normal payment system is that with bitcoin, the commission is decided by the person making the transaction and is not a percentage of the total amount forwarded to the other person.

For example, sending 1 BTC to someone by choosing to pay 0.00001BTC commission which would be equivalent to 0.20€ cents. So with this method, the other part can have 1 BTC in its account which nowadays would be roughly equivalent to €20,000 with 0.20 cents commission paid to the miner. Much better than paying a percentage of the total amount obtained, ranging from 0.99% up to 4%. Translated into € the commissions would be between €198 and €800 that the bank would charge for merely acting as an intermediary in the transaction.

Blockchain transactions are also very secure because they are irreversible, but they take time to be confirmed in the network and involve fees that can be high or low, depending on the choice of the person carrying out the transaction.

Even if one does not have the bitcoin files in one's hand, but only a certificate that certifying the ownership of a certain number of bitcoins, which allows one to use these virtual currencies, these are held within wallets. These wallets can be applications, software on PCs or physical USB sticks or hard drives.

Applications, for instance, contain public addresses, i.e. strings of code to be shared with other people in order to be able to receive or send bitcoins, a kind of IBAN, and private keys that must not be shared with anyone, otherwise one could lose ownership of one's wallet and thus all its contents.

The private key certifies ownership and by removing it, one is no longer able to recover the assets within the wallet.

The high security guaranteed by blockchain is a double-edged sword, which is why this technology is still being tested and not all people can fully believe in it.

If money is stolen or moved from the wallet, it is lost forever. The blockchain uses an advanced encryption system that is much more secure than the traditional passwords you have to protect your account.

Increased security, however, could lead to many problems.

In case one loses one's pin or password to access one's bank, one only has to present oneself in person at the counter to prove that one is the owner of the account and things are quickly resolved. Even if purchases were made without the owner's permission, the bank could cancel them and with the help of insurance, the amount spent without the owner's consent would be credited back to the account.

With cryptocurrencies, it has happened very often that people lose their access keys and can no longer access their money. Paradoxically, these people can access the blockchain network and view the balance of their wallet, but they have no access at all.

This situation often occurs when people unconsciously buy a cryptocurrency cheaply and forget about it in their digital wallets, only to discover months or years later that the initial investment is now worth thousands, if not millions of dollars.

The problem is that after years, a person cannot remember the access key (a whole sentence) that was used during the creation of the wallet and therefore that money is present in the wallet, but lost forever, because it is no longer accessible.

In internet forums it is not uncommon to come across many people asking for help on how to recover the access key, because there is no answer, the access key cannot be recovered.



2.3: Private and Public Keys

The story of James Howells is one of the most famous. He lost the access key to his digital wallet, which still has more than 8,000 bitcoins worth almost half a billion dollars. The story was reported in the article of the famous newspaper 'The New Yorker'. (D. T. Max, 2021).

Not being able to retrieve one's access key leads people to distrust this technology.

The positive aspect of using bitcoins in transactions is that it is impossible for a fake cryptocurrency to be accepted and registered in the bitcoin blockchain network. Only real bitcoins can be registered and approved during the transaction.

This methodology puts a huge brake on the counterfeit market that costs governments around the world billions of dollars in controls.

2.6 Cash and non-cash money and the 21 million limit

A very important distinction to make is to distinguish what is 'cash' from what is not. Very often people tend to believe that cash means 'physical', or 'paper', and that the cashless society is considered 'digital', but this is not the case.

The answer is very simple, one deals with 'cash' (banknotes, gold, bitcoin) when one has it in it's hands, therefore, one is in direct possession of that asset or currency. You do not have possession of your money, if you cannot spend it without the intermediation of a third party (e.g. banks), so you do not have cash money.

Today's society is one based on cashless, i.e. the creation of new money with intrinsic value, but as time goes on, precisely because there is no limit to the creation of money, the value of money itself goes down.

Before to talk about the limit that bitcoin has it is necessary explain that the term Bitcoin refers to the entire system, which includes the Bitcoin network with codes, protocols; the term bitcoin, with a lower word b, refers to the actual cryptocurrency.

"Bitcoin is capped at approximately 21 million bitcoins" (Ostbye P., 2018), the real reason for the number is unknown, but this factor is very important that makes cryptocurrency a limit asset in its own right.

Thanks to this peculiarity, the cryptocurrency is able to fight inflation, moreover Satoshi, introduced 'production cuts' called 'halving' precisely to try to eradicate inflation.

According to Gates, "every 4 years the amount of new bitcoins put into circulation halved and the "production" of new units will end when 21 million are reached, so inflation will gradually decrease until it becomes deflation after the last unit is undermined." (Gates D., 2019)

This topic will be dealt with in more detail later.

2.7 Bitcoin inflation and deflation

"Inflation is the process by which a currency like the dollar or Euro loses value over time, causing the price of goods to rise. Bitcoin (and some other cryptocurrencies) are designed to experience predictable and low rates of inflation." (Coinbase.com)

Inflation, therefore, leads to a rise in the prices of goods and services for a certain, undetermined period of time, in which money loses value, leading people to save instead of investing.

Inflation occurs for several reasons, there is no single trigger, but mainly it occurs when the supply of goods decreases while demand increases, causing the prices of the goods in question to rise.

Inflation is not always viewed negatively, in fact according to the Central Bank of Europe, "An inflation rate of 2% is low enough for the economy to fully reap the benefits of price stability while also underlining the ECB's commitment to the following. " (European Central Bank, 2022)

Inflation is linked to the geopolitical aspects of nations, in fact in case of wars, conflicts between states, inflation is subject to increase. Living in a world where all states are interconnected, a conflict, war or any situation that may upset the actual balance can lead to a dramatic increase in price levels.

A recent example is the ongoing war between Russia and Ukraine on Ukrainian territory. As a result of the conflict, the price of goods has risen and the EU has had to cope with the reduced availability of imported goods both from the Ukrainian territory and the rising price of gas imported from Russia due to the sanctions the EU has issued against it.

Because of this, households now have to pay more to get the same amount of goods that they could afford cheaper the year before.

To cope with these price rises, the ECB started to inject new money into the economic system, decreasing the power of money and thus increasing inflation. In addition, interest rates were raised, discouraging people from borrowing and investing, but encouraging savings instead.

With inflation, saved money is also affected, as the basket of goods one could afford in the past with the same amount of money is larger than the basket of goods one can afford today with the same amount of money.

In addition to inflation, there is also hyperinflation and it occurs when consumers use a foreign currency to be able to buy essential goods in their own country.

"Hyperinflation is defined by a threshold in the rate of increase in prices of 50% per month by one definition, 1000% per year by another. The first two clusters of hyperinflationary episodes in the twentieth century came at the end of World War I and World War II, respectively." (Frankel J, 2010)

With the use of bitcoin, it is assumed that inflation is solved, and this situation is not optimal for anyone because when inflation is close to zero, the economy becomes stagnant. A minimum percentage of inflation must be there to ensure the functioning of the economic system.

Assuming then that we live in a world where the global currency is bitcoin and there is no inflation, the problem may come with deflation.

1 bitcoin is divisible by one satoshi, a name that comes from its creator, therefore "1 bitcoin would be equivalent to 100 million satoshi, which means that there can be 0.00000001 BTC and no less.

According to Coen's book, if one compares it to the US dollar, the most widely used currency in the world, one finds that there are 1.5 trillion dollars in circulation, or 1.5 billion, simplifying it to 1.5×10^{18} , as opposed to 2.1 trillion satoshi, or 2.1×10^{15} .

The units of satoshi cannot be fractioned any further, so assuming that 1 satoshi equals 1 dollar, all transactions of less than 1 dollar cannot be carried out.

Fortunately, cryptocurrency is digital and through other sub-networks of the blockchain, such as the Lightning Network, it is possible to further split the satoshi and thus be able to pay for goods worth even less than 1 satoshi.

The only limit in this case is the 21 million units of BTC.

The continuous split of the single satoshi could be the key to the circulation of new units of value without necessarily having to create a new currency.

Both scenarios, inflation and deflation, are to be avoided, because in the first case the value of the currency falls and more currency is injected to make up for this gap, whereas in the second case, the decision to split a satoshi more and more, increases the value of the single satoshi, so, for example, people who previously earned 1 BTC will now earn 0.5BTC due to deflation.

The addition of currency through bitcoin can be done not by adding bitcoin to the 21 million, but by continuing to split the single satoshi that makes up the bitcoin.

So you have the exact same problem as inflation but in reverse.

2.8 Lightning network

The Lightning Network is a payment channel for both individuals and companies in which cryptocurrencies such as bitcoin are exchanged.

It is often referred to as the 'Second Layer' of the Bitcoin blockchain network.

Through this network, it is possible to carry out thousands if not millions of transactions per second and thus solve the gap between the number of transactions processed with blockchain technology and Visa/MasterCard.

Transactions, carried out by users through the Lightning Network, take place through the payment of a very cheap fee of around 10 satoshi, or \$0.0019.

In order to use this network, the user must necessarily create a wallet and deposit or have satoshi or entire bitcoins sent.

The difference with the blockchain network is through the Lightning Network, users can create a closed channel or group, in which for example friends or acquaintances are present, and can exchange satoshi directly with each other, without a miner having to collect their transactions and enter them into a new blockchain block.

The only commissions clients have to pay are for the service offered by the network, which cost very little.

For each channel one decides to open, a capacity in satoshi must be established in advance, e.g. 0.1 BTC, or 10 million satoshi. Beyond that threshold it obviously cannot be deposited.

Of course, every open channel must be approved and entered into the blockchain network to ensure the security and privacy of transactions.

This could be a good solution for states that might want to adopt a cryptocurrency as their official currency, solving the problem of the speed of the number of transactions.

Transactions taking place within the channel are not recorded on the main blockchain, hence the figure of the miner who is not required to validate any transactions as everything takes place within the channel.

Practically the only transactions that are recorded on the blockchain are 2: the creation of the channel and when the channel is closed and the final balance is redistributed between the parties.

2.9 Bitcoin dark past

The dark side of this cryptocurrency is that it was and still is used as a bargaining chip to finance both micro and international crime.

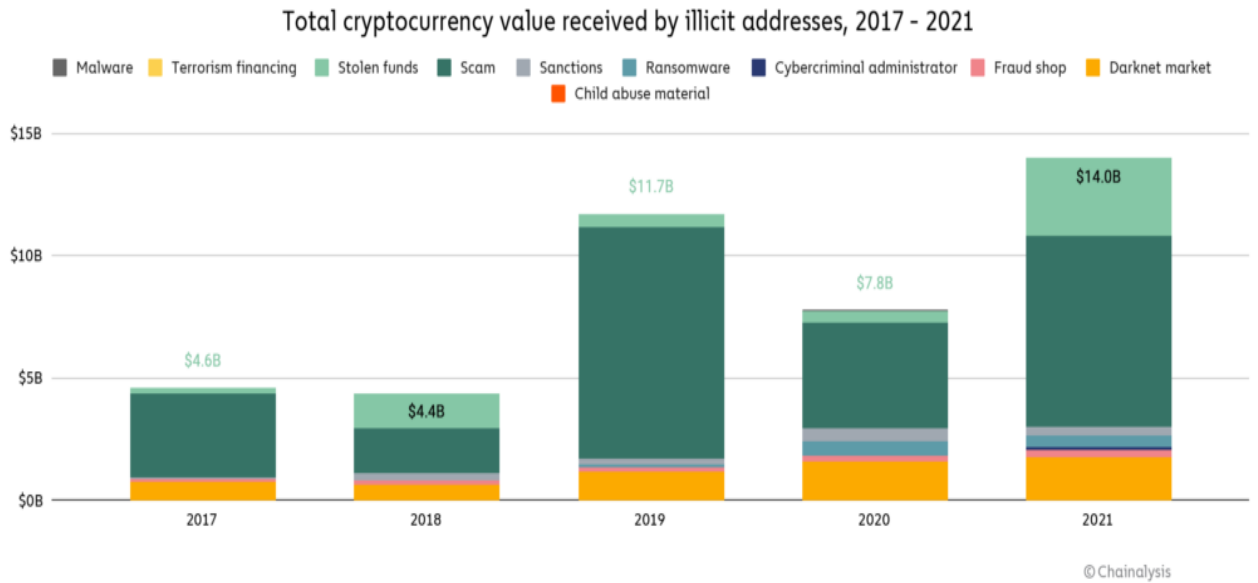
It is the perfect currency as it is not subject to any restrictions. In fact, blockchain technology does not discriminate against any transaction if it complies with the imposed parameters. The newspaper article Daily Fintech reports "Cash is amoral. Cash does not care what you do with it. You can buy legal drugs or illegal drugs. You can use it to kill someone or save somebody's life. The same will be true for digital cash" (dailyfintech.com, 2018)

Bitcoins for criminals are only a means used to achieve their goals, even machines and real money like dollars are used by criminals to be able to continue their illicit activities.

Cryptocurrencies are used to buy anything, in fact in states like the United Arab Emirates, bitcoin is seen for all intents and purposes as a normal currency with which you can make any transaction, even buy a coffee.

"According to the head of the United Nations Office on Crime and Drugs, organised crime groups worldwide had total assets of \$322 Billion in 2005." (Havacscope, 2009)

Here there is "Cryptocurrency-based crime hit a new all-time high in 2021, with illicit addresses receiving \$14 billion over the course of the year, up from \$7.8 billion in 2020." (Chainalysis Team, 2022)

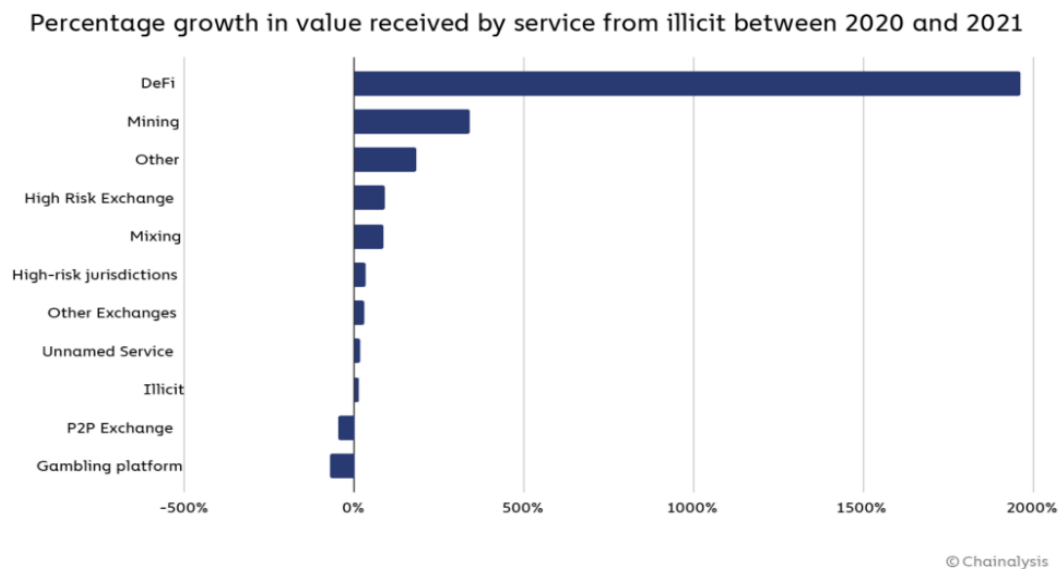


2.4: Bitcoin illect transactions graph

The data speak for themselves: criminals still prefer to use the dollar and not bitcoins as their main currency.

The total number of transitions made with bitcoin is nowhere near the amount of a single year's criminal activity financed in dollars.

Bitcoin is linked to crime because it had the misfortune to be the world's first cryptocurrency and above all, it is the cryptocurrency that still has the most value today.

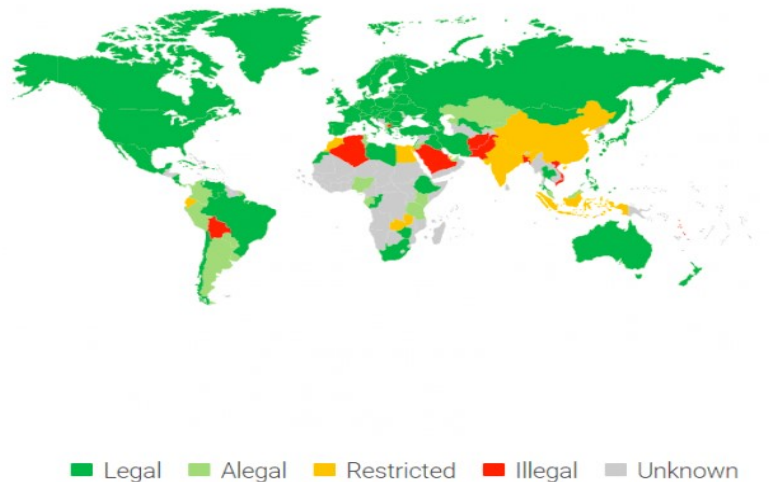


2.5: Bitcoin usage

This graph highlights how many bitcoins are used to finance illicit activities.

3. ENVIRONMENTAL IMPACT

3.1 Cryptocurrencies and countries



3.1 World Crypto Map

Cryptocurrencies are accepted by most countries in the world, but paradoxically in countries such as China, a preferred country for miners of cryptocurrencies such as bitcoin due to the low cost of energy, in which between 60-70% of the total bitcoin are mined, (Badea, L., & Mungiu-Pupăzan, M. C. , 2021) the same mined cryptocurrencies cannot be used as a currency of exchange within the country in question.

The fact that they are decentralised does not mean that cryptocurrencies are not influenced by any factor, in fact, if a state decides not to accept cryptocurrencies within its territory, there is nothing to be done. Furthermore, cryptocurrencies are influenced by other external factors, such as the cost of electricity. An increase in this cost inevitably leads to fewer cryptocurrencies in circulation, as mining them would have no benefit for the miner.

As will be explained later, the environmental problem could be a factor in bringing cryptocurrencies to a standstill.

3.2 Environmental impact

Normal electronic devices such as computers, tablets consume energy. This energy must be produced in order to ensure the functioning of all these electronic devices, and many countries use various techniques to do this.

The production and consumption of energy for the operation of computers causes environmental pollution, which the user does not perceive directly, as he or she is actually doing nothing wrong except surfing the Internet for entertainment or work.

Another issue that increases pollution is the disposal of various electronic components, such as batteries that need special treatment to minimise the environmental impact they may have. The source of pollution, therefore, is mainly the increase in greenhouse gases produced by overheating computers, servers that enable web surfing, and the pollution of land and water during the disposal of batteries or electronic components at the end of their life cycle.

Bitcoin contributes to rising Co2 levels, due to the enormous energy it requires to run the PoW (proof of work).

The carbon footprint, like the emission of greenhouse gases during its life cycle, has been and still is very persistent, in fact, studies have reported that if Bitcoin continues with this trend, it could be a major cause of global warming.

Due to the fact that solving puzzles to be able to mine bitcoin will become more and more complex as time goes by, computers will need more and more energy to be able to solve increasingly complex calculations, so much so that it has been estimated that in the future "bitcoin emissions will sum up to 2 gigatons until 2100, an amount comparable to 7% of global emissions in 2019". (Qin, S., Klaatzen, L., Gallersdörfer, U., Stoll, C., & Zhang, D. , 2020)

Moreover, in countries where bitcoin mining is done through the use of coal-based electricity, it would lead to a deterioration of air quality as well as a rise in global temperature.

3.3 Zero Emissions

In the European Climate Act, the European Union decided to commit itself to a very ambitious goal of achieving 'zero emissions' by 2050.

Climate change is inevitably changing the planet, as far as the climate is concerned, but it has devastating effects on the surrounding environment.

Rising sea levels, acidification of the oceans, droughts, floods and loss of biodiversity are just some of the key issues affecting the planet.

All these premises are present within the 'Paris Agreement' (European Commission, 2015)

This could be a problem with regard to cryptocurrency mining, as most of the energy used for this activity comes from elements that are highly polluting to the environment, such as coal.

Renewable energy has not yet reached the point of being able to meet global energy needs, and thus the increase in energy required by cryptocurrencies such as bitcoin for both mining and maintaining the blockchain network, has to reckon with the energy shortage that will occur if a solution is not found to reduce consumption or at least develop a method to be able to produce more clean energy that does not impact the environment.

Some solutions have been found through altcoins, created specifically to try to improve the current situation of cryptocurrencies like bitcoin that have shortcomings.

3.4 Altcoin

The mining of all bitcoins is planned for the year 2140, so it will take more than a century, and in the meantime it is of paramount importance to find a way to be able to both produce energy through renewable sources and to be able to decrease the overheating and the amount of energy required for the mining of this cryptocurrency.

There are many alternatives to the bitcoin cryptocurrency, in fact, altcoins have been created to try to solve the flaws that the Bitcoin system has.

Altcoins', or alternative coins, are all those cryptocurrencies created to solve the problems of present bitcoin, such as the slow recording of transactions on the blockchain, the reduction of energy used to add a block of data on the bitcoin blockchain, etc.

They are all those cryptocurrencies that came into being after bitcoin and their purpose is to correct or modify certain issues that limit or make bitcoin obsolete.

3.5 Altcoin vs bitcoin

The market is now saturated with **cryptocurrencies**, according to Exploding Topics "**today, there are over 20,000 cryptocurrencies in circulation.**" (Howarth J., July 20, 2022) and most of these have only been created to scam and steal people's money by inventing unrealisable projects on paper.

Other cryptocurrencies that have interesting projects include Ethereum, Litecoin and many others.

Ethereum was created as a blockchain that not only allows its users to transact with the ethereum cryptocurrency as bitcoin does, but also provides more functions. In fact, this blockchain is more flexible and adaptable to different types of applications.

Transactions take place by means of 'smart contracts', i.e. actual contracts that not only follow precise rules, but are also called smart because they are able to check whether the conditions set out in the contract have been fulfilled or are applied automatically when these conditions occur.

Litecoin is a cryptocurrency that was created with the aim of improving aspects of Bitcoin.

All transactions are recorded within the Litecoin blockchain, which uses the same cryptographic techniques as Bitcoin. The difference with the Bitcoin network is that in Litecoin, the average time for adding a block to the blockchain is around 2.5 minutes compared to Bitcoin's 10 minutes.

The validation of transactions is again done using the proof-of-work technique, but since it takes only a short time to validate and enter the block of transactions into the network, this requires a lot of computing power and thus high energy consumption.

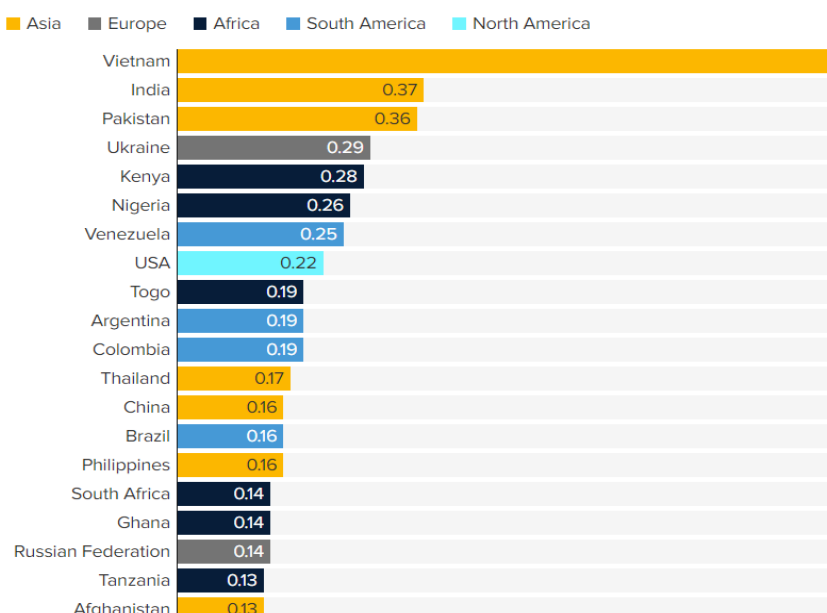
This cryptocurrency is also not unlimited, in fact to obtain it you have to mine it and the limit number is around 84,000,000 units.

This means that in order to mine litecoin, one needs much more sophisticated hardware than bitcoin, because they have to be able to process large amounts of data faster to solve the famous puzzles.

4. CRYPTOCOUNTRIES VENEZUELA, UKRAINE AND DUBAI CASES

4.1 Pro-cryptocurrency states

Many countries have started to incorporate the possibility of introducing a cryptocurrency into their economic system.



4.1 Countries that adopt cryptocurrency

As can be seen in the tab, countries that one would not expect such as Vietnam, India and Venezuela believe a lot in this technology, more out of necessity than the real project behind the cryptocurrency world.

The real reason why these countries are experimenting with this new type of currency is because people do not trust their government and therefore prefer to deal with a decentralised currency instead of one under the influence and control of the government, which is very often corrupt or under a dictatorship.

Two countries, Venezuela and Ukraine, will be analysed, focusing on their history and how they came to be in the situation they are in today.

4.2 The Venezuela case

Venezuela is a complex country, as there are many written and unwritten rules that govern it. It is a very controversial country because the average salary is around USD 30 and the cost of a pizza can be around USD 23, especially in the big cities.

"According to new data from the National Survey of Living Conditions, collected each year by the three major universities in the country, ahead of the zeal for statistics that the government

does not provide, an unbelievable 94.5% of people are sunk into poverty, living with less than \$3.2 a day. " (Weinberg M., Braun J., 2021)

The emigration of people to neighbouring countries like Colombia has decreased over the years, but continues to affect a large part of the population.

According to Wolddata.info, Venezuela, nowadays, is one of the countries most affected by inflation., This exceeded the threshold of 130 thousand %. Money overnight was no longer worth anything.

The problem in this country is that foreign money could be exchanged in 2 ways:

- legally, through legal exchange rates;
- on the black market, where exchange rates were inflated out of all proportion.

The currency used in this country is the Bolivar, and currently the exchange rate with the euro is 1 for 5.56 Bolivars. (Google date, 2022) This is the official exchange rate, the one applied by the banks, while as far as the exchange rate on the black market is concerned, 1€, in July 2022, would be worth 252.156,57 Bolivars. (Exiap, 2022)

As it turns out, it is not possible to manage such a situation and in fact life in Venezuela is very difficult for the middle class as everyday goods, such as a mobile phone, car, etc., cannot be bought by people as the prices of products are updated daily following the black market rate.

4.3 The history of Venezuela

Venezuela has not always been a country in crisis. On the contrary, before 1914, the year in which a black, viscous liquid (oil) emerged from the subsoil, Venezuela was populated by 2 million inhabitants entirely dedicated to agriculture.

After 1914, oil production exploded and was a blessing, but at the same time, a curse that led the country to fall into ruin.

Major oil companies immediately flocked to Venezuela to extract the oil and it went from a few thousand barrels extracted in 1920 to millions of barrels extracted the following year, making Venezuela second only to the USA.

Oil revenues guaranteed two-thirds of the country's national income, and were more than 90 per cent of the country's exports.

This situation soon led Venezuela to suffer from 'Dutch disease'.

"Dutch disease is a shorthand way of describing the paradox which occurs when good news, such as the discovery of large oil reserves, harms a country's broader economy.

It may begin with a large influx of foreign cash to exploit a newfound resource.

Symptoms include a rising currency value leading to a drop in exports and a loss of jobs to other countries". (Chen J., 2021)

The discovery of oil, therefore, brought about a radical change in the lifestyle of people who had previously lived in close contact with nature and could now afford to live a much more comfortable life, thanks to the income from crude oil.

The cities grew a lot and in those years there was a great mass migration to cities like Caracas and La Guaira.

Venezuela's good fortune was that it was able to find oil at the right time because, in those years, world demand for oil had skyrocketed, thanks to the post-war economic boom and the fact that the price of oil in the Middle East had risen, shifting the attention of nations to Venezuela.

Companies were free to invest in Venezuela thanks to a state that did not hinder the entry of foreign capital and, on the contrary, encouraged more investment.

The only constraint, if one can call it that, was not to get in the way of the oppressive government of President Jimenez, who ruled the nation with an iron fist, thanks in part to petro-dollar-funded soldiers.

Jimenez's goal was to modernise the country and indeed in the capital, Caracas, numerous skyscrapers and luxury villas were built, with the aim of impressing and attracting people from foreign countries. This strategy worked and after the war, many people from the USA and Europe were attracted by the luxury and dream life that the country promised. A bit like what is happening today in Dubai with all the luxury and ostentation that is offered to people. Venezuela needed to fill the void left by the Venezuelans who abandoned farming for the much more lucrative mining business and left the countryside abandoned, forcing Venezuela to import basic necessities from neighbouring countries.

With the agricultural sector broken up, the Venezuelan economy was not diversified enough to provide employment for most people and this generated an increase in local spending that the government had to manage through subsidies and jobs in the public administration to all Venezuelans with low incomes.

The problem, at the time, was that the Venezuelan people had become accustomed to spending to appear, on luxury goods, such as air conditioners, cars and so on... The government continued to finance its citizens through subsidies, guaranteed thanks to the high demand for oil.

Between 1980 and 1988, there was an excess of oil production, oil supply far exceeded demand, and brought down the price of the barrel. Because of Venezuela's generous government, citizens continued to spend instead of saving, even in the face of falling salaries. When the Bolivar, the strongest currency in South America, was devalued by 75%, Venezuelans tried to change their currency into dollars as soon as possible, but restrictions prevented the population from taking capital abroad.

This scenario soon brought the population into a situation of uncertainty, leading many times to violent clashes with the police. Before long, the devaluation of the Bolivar led Venezuela to find itself without resources to pay for food imports.

The devaluation of the Venezuelan Bolivar, was a huge problem in a country where little was produced but much was consumed, the government's thinking had always been to import from other states instead of internalising production and becoming self-sufficient. The goal had always been to buy cheaply and then resell the products at a premium.

The lifestyle up to that time was very high, but the fall of the Bolivar brought out the real shortcomings of the country, the basic necessities disappeared from the supermarkets and appeared on the black market with exorbitant prices.

In 1989, the civil confrontation, named 'Caracazo', was one of the most violent and marked the beginning of Venezuela's negative parabola.

From this moment on, corruption and the black market began to take over the entire state economy, while the purchasing power of the Bolivar continued to fall, bringing the situation to the present day.

4.4 The Petro

Venezuela, due to its high inflation rate, is one of the few countries where payments through cryptocurrencies, especially bitcoin, are accepted in many shops.

The low cost of energy and the economic crisis that has been going on for years give people an incentive to believe in cryptocurrencies.

It is estimated that over 2.9 million people, 10.3% of Venezuela's total population, currently own cryptocurrency. (triple A, 2022)

The curious thing is that in a poor country like Venezuela, cryptocurrencies are not only spreading out of necessity, but as mentioned earlier, the low cost of energy in this country has allowed many people to take up mining.

The government's lack of transparency may put a serious strain on the transition between the local currency the Bolivar and the cryptocurrency bitcoin.

On the other hand, Venezuela introduced its own cryptocurrency 'Petro' with the aim of increasing the value of the bolivar, as both currencies would travel on the same track.

As a nation with a lot of problems on the economic side, the Petro has not been very helpful and people are not 100% confident in giving up their normal currency to the new cryptocurrency, which was aimed at decreasing inflation. The effect has been exactly the opposite, that is, to encourage inflation as the Petro has not been supported by people in the cryptocurrency market. In short, it was bought and traded by almost no one.

Transactions with this cryptocurrency are practically non-existent and centralised government control is its greatest weakness.

Unlike with Bitcoin, the Petro is not a decentralised currency, and the government has the ability to control it and decide on structural changes.

In a Bloomberg article it is reported "the organisations that rank cryptocurrencies have described the petro as a "scam", with sites like ICOindex, ICObench, Cryptorated and ICOreview giving negative reviews or not even rating the petro due to its status". (Laya P., 2018)

4.5 Ukraine Case

The case of Ukraine is very tricky to analyse as there is an ongoing armed conflict with Russia and the country as you remember it no longer exists. The entire country is now a heap of rubble, but as can be seen in the table at the beginning of the chapter, Ukraine holds a high position in terms of cryptocurrency use.

The war in Ukraine has put a serious strain on the global economy as the country is of key importance for exports of steel, iron, mining, agricultural products, machinery and chemicals. Many countries depend for a large percentage on Ukrainian exports, and this war has brought exports to a standstill.

Countries that are most reliant on select Ukrainian exports

Share of ___ imported from Ukraine in 2020

Wheat		Maize		Sunflower oil	
Moldova	91.8%	Madagascar	89%	Niger	96.7%
Lebanon	81.2%	Belarus	68.7%	Kenya	77.9%
Qatar	64%	Lithuania	67.7%	Taiwan	77.5%
Tunisia	49.3%	Libya	64.3%	Netherlands	76.7%
Libya	48.3%	China	55.8%	Benin	76.2%
Pakistan	47.9%	Netherlands	50.9%	UAE	75.6%
Indonesia	28.7%	Tunisia	50.5%	Sri Lanka	75.1%
Malaysia	26.2%	Israel	39.8%	Moldova	74.7%
Egypt	25.6%	Portugal	38.6%	India	74.4%
Bangladesh	25.2%	Sri Lanka	34.4%	Qatar	72.3%

4.2 Countries that depend on Ukraine

Because of this, the price of basic necessities in Europe, but also in many countries in Africa, rose, increasing the cost of living, which in turn led to an increase in the inflation rate.

The welfare shutdown of all assets in Europe for a medium to long period due to Covid19 led to the depreciation of the euro against other currencies, and to compensate for this devaluation, states got further into debt with the Central Bank in order to obtain funds to save as many assets as possible.

The advent of this war further aggravated the position of the euro, and to cover the rising cost of living, the Central Bank began to inject more money into the system, lowering the interest rate, thus discouraging investment and favouring savings instead.

“The battlefield for this war is worldwide; it's just that it is primarily an economic battlefield. When Russia attacked Ukraine, the other great powers did not send soldiers and tanks.

Instead, they orchestrated one of the most comprehensive economic warfare schemes ever devised.

Measures included cutting Russia out of the international payments system called SWIFT, blocking Russian exports (except most commodities) and discouraging trade of many kinds with Russia. Many countries froze accounts owned by Russia's central bank and also accounts owned by prominent wealthy Russians." (Cobb K., 2022)

A third world war, one conceived and thought of in the old style, would not be optimal for anyone, as the technologies used and the modernisation of weapons would not give anyone a chance. Literally, no one would come out alive from a world war with the latest generation of weapons.

In an increasingly interconnected world, events that may happen in one state, even if it is geologically distant, can have serious repercussions on many other states that seemingly have no connection.

The inflation that is spreading in Europe because of the conflict is an example.

According to eurostat "The euro area annual inflation rate was 8.1% in May 2022, up from 7.4% in April. A year earlier, the rate was 2.0%." (Eurostat, 2022).

4.6 Ukraine and cryptocurrencies

Due to the war, the Ukrainian economy is practically destroyed and people, in order to safeguard their savings, have started to invest in cryptocurrencies, which, despite the high price volatility, have preferred to rely on a decentralised system. .

According to The Economist, one of the famous economic magazine, Ukraine has always adopted a very open policy regarding cryptocurrencies, especially Bitcoin and Ethereum, the two main cryptocurrencies on the market.

In fact, as soon as President Putin gave the order on 24 February 2022, the invasion of Ukrainian territory, the government a few days later launched a fundraising campaign on Twitter, a very popular social platform, using the cryptocurrencies Ethereum and Bitcoin. (source: The economist)

"The Ukrainian government...have raised \$63.8 million, through more than 120,000 cryptoasset donations since the start of the Russian invasion. " (Elliptic, 2022)

These 2 cryptocurrencies, being decentralised by nature, are not influenced by events affecting states, in fact as mentioned earlier, the price is given by the intersection of supply and demand.

Due to inflation and the negative trend that global markets are now experiencing, it is normal to see the value of these very volatile assets fall, but in emergency situations such as a war, they can be an investment so as not to lose everything.

4.7 United Arab Emirates Dubai

Unlike Venezuela, the UAE is not sailing in bad waters. On the contrary, the economy as well as the Gross Domestic Product is growing steadily, thanks mainly to oil exports and investments by foreigners, attracted by the tax breaks and low taxes that entrepreneurs have to bear.

The streamlining of bureaucracy also helps people a lot by attracting many entrepreneurs who decide to open a business or make investments in the Emirates.

As of today, 1 dollar is worth approximately 3.67 dirhams, so inflation in this respect is under control. (Xe, 2022)

The United Arab Emirates, especially Dubai, is the perfect place for cryptocurrencies to flourish and are treated as real currency that can also be used for everyday transactions.

In Dubai, for example, transactions can be made with both bitcoin and etherium, the 2 main cryptocurrencies in circulation.

Another peculiarity is that Dubai has not introduced any taxation on capital gains or transactions that are made, not affecting the decentralisation that underlies crypto in the slightest.

For now, the country is pro-crypto, not going to hinder in any way the activities of the latter, a utopia as far as other states are concerned, which somehow always try to earn something from any activity, especially in cryptocurrencies, given, that the volume of business in recent years is in the billions of dollars, money that many states do not want or cannot afford not to earn.

4.8 Tax haven

Taxation in Dubai can be said to be almost non-existent, thanks to the fact that it is possible to set up a company in the so-called 'free zones'.

These areas are not subject to taxation, in fact any tax for setting up and maintaining the company does not exist.

Taxes on wealth income are not paid in this state and along with Honk Kong, there is no VAT in Dubai, which means that, in the prices of consumer products, there is not the surcharge that there normally is on products sold in all other countries of the world.

Furthermore, there is no tax on capital gains and dividends. (HSBC Expat, 2022)

This state, therefore, is perfect for both entrepreneurs and investors, who hold shares because they do not have to pay any tax on the dividends they receive from their holdings.

Practically a paradise for those who want to save money and safeguard their income.

So how can this country be so rich if it does not make money from taxes? The answer is very simple, oil. "Oil businesses are taxed at ... a 55% rate". (MSG)

The low taxation therefore attracts many people to do business in the Emirates city, in fact the trend is steadily increasing, with more and more companies in the area.

“Many start-ups prefer to deal and transact in bitcoins” (A. Singhal, A. Rafiuddin, 2014) because tax-free.

The United Arab Emirates is a very active country when it comes to cryptocurrencies; in fact, it is home to the 2 largest cryptocurrency platforms in the world.

The first is called Crypto.com, the second is Bybit.

The former company decided to open its headquarters in Dubai, while the latter has long since decided to move its headquarters from Singapore to Dubai

The reasons have already been alluded to above, taxation and the possibility of being able to spend one's cryptocurrencies like a real currency, has led these companies to move to a country that does not hinder any new digital initiatives, and then the profit made is practically not taxed, so people have more personal gain from the profits that are not taxed.

Both crypto companies aim to contribute to innovations in digital assets, that is, to try to digitise all those processes and make them simpler, more immediate and more secure, thanks to the blockchain technology behind them.

Of course, only the top two crypto companies have been mentioned, but there are many others that have decided to move to Dubai, companies like Binance and many others.

A very interesting feature is that there is a Crypto Oasis in Dubai, i.e., the largest free zone in Dubai in which foreign companies are housed.

The largest companies operating in the cryptocurrency sector are concentrated in this area.

The area is named Dmcc, which is the second tallest skyscraper in Dubai, behind the Burj Khalifa, the world's tallest skyscraper.

5. CRYPTOCURRENCY SCENARIO

5.1 Exchange rates

Almost all states in the world have their own currency, except for those that have chosen to adopt the same currency such as euro.

In Asia, for example, China has the Renminbi, more commonly known as the Yuan, Russia the Russian rouble, and so on. The same story in America, Africa and Europe, see the United Kingdom, which even though it left the European Union has never given up its national currency.

Currencies appreciate or depreciate on a daily basis due to exchange rates. Investors and entrepreneurs are affected by this phenomenon.

The exchange rate allows a relationship to be found between a domestic currency, which can be the euro in this case, and a foreign currency such as the dollar.

Thanks to the exchange rate, it is possible to calculate how much a certain amount of euros is in dollars or vice versa.

The exchange rate can be defined in two main ways:

- Per direct quote or certainly for uncertain, which indicates how much foreign currency can be bought with one unit of domestic currency.
- Indirect quote or uncertain for certainly, i.e. how much a certain domestic currency is worth in relation to a unit of foreign currency.

The exchange rate works by taking, for example, Euro-dollar and knowing how many dollars you can buy with 1€.

Theoretically, the explanation could end there, but the problem is that interest rates are variable; therefore, the value of currencies fluctuate every day. There can be appreciations, which means that the value of a particular currency increases, or depreciations in which there is a loss of value by one currency against the others.

5.2 Appreciation and depreciation of a currency

The appreciation and depreciation of a currency, concerns the value it has against other currencies. The greater the appreciation, the greater the value of a currency and vice versa in the case of depreciation.

When, for example, the euro appreciates, it means that it has become stronger in relation to other currencies and therefore more of other currencies will be needed to buy 1€.

So if there is an appreciation of the euro against the dollar, the Italian tourist visiting the US will have an advantage because he will be able to get more dollars with the exchange rate and afford to buy more things.

As far as investors are concerned, the reasoning is the opposite, in fact, assuming that an Italian investor decides to invest 10,000 euros at a time when the euro-dollar is 1.09, the

Italian investor will receive \$10,900. It is assumed that the US economy is doing well and therefore there is a depreciation of the euro against the dollar at around 1.07 euro-dollar. The Italian entrepreneur decides to close his position with a profit of €10187, because the value of the euro has fallen against the dollar.

In this case, in order to make money as an investor, one has to hope that one's currency will depreciate compared to today in order to be able to buy more tomorrow.

The game is very simple, in fact for every currency you appreciate, all the others depreciate. The appreciation and depreciation of a currency can bring advantages or disadvantages depending on one's role in society.

Another example is that of importers and exporters, in fact, importers have an interest in their currency being strong in order to be able to buy a large amount of foreign currency and import more products, on the other hand, exporters have an interest in their currency depreciating so as to incite foreign buyers to buy as much as possible from them.

5.3 Cost of living, distinction between United Kingdom and India

However, the appreciation and depreciation of currencies can lead to unbalanced situations caused mainly by inflation.

The adoption of a single currency like Bitcoin would solve the problem of inflation, but would not be accepted by many nations, as they would lose their market hegemony to other countries.

This is a table obtained from the website 'livingcost.org website' comparing average living costs between England and India.

	India	United Kingdom
Cost of living one person	\$432	\$1892
Cost of living Family	\$1057	\$4393
One person rent	\$175	\$1151
Family rent	\$332	\$1866
Food expenses	\$167	\$425
Transport expenses	\$47.3	\$166
Monthly salary after tax	\$656	\$2872
GDP per capita	\$1928	\$41059
Human freedom index	7.02	8.87
Life expectancy	69.9	80.9
Corruption perceptions index	40	78
English speaking %	10.6%	98.3%
Higher education	73	100
Quality of life	51	82
Population	1.33B	66M

5.1 Comparison India and UK living costs

"The average cost of living in India (\$432) is 77% less expensive than in the United Kingdom (\$1892). India ranked 187th vs 12th for the United Kingdom in the list of the most expensive countries in the world. " (livingcost.org, 2022)

England has every interest in keeping its currency stronger, as being a predominantly importing country, it can import more products and invest more given the low cost of living and labour in foreign countries.

Multinationals such as Apple have moved their production to countries where the cost of living is low in order to have more production capacity at the lowest possible price.

Obviously, countries such as India and China are at a disadvantage, because they find themselves with a weak currency that is not advantageous for imports, but advantageous for exports by attracting foreign investment and thus more jobs to offer their people.

The web site 'cert simple' in one of its articles reports "The average worker earns about \$10 per hour (12 hours per day, 30 days per month), based on a conservative estimate. It costs 13 yuan per hour, or about \$1 per hour." (Louis, 2021)

5.4 A national cryptocurrency

There are already nations that have created and approved their own cryptocurrencies with the main purpose of decreasing a strong inflationary current, as in the case of Venezuela with the Petro, or India, which has seen increased investment in cryptocurrencies and has decided to launch the digital rupee. "The Reserve Bank of India (RBI) is set to launch a central bank digital currency (CBDC), also called Digital Rupee, in 2022-23." (the economist, 2022).

The aim is to incentivising people to use this new currency instead of Bitcoin and Ethereum. However, the adoption of digital cryptocurrencies would not solve the gap seen so far, because even if, for example, England wanted to adopt its own cryptocurrency, it would be of higher value than the digital rupee, precisely because England would never want to lose its purchasing power to other countries, in this case India.

Furthermore, in order to discourage this, England might decide not to recognise the digital rupee as a method of payment in its territory and thus isolate and depreciate it.

This scenario is happening in Venezuela where the Petro is depreciating and the bolivar is continuing to lose value.

5.5 An international cryptocurrency

In this scenario, things would change. The adoption of a worldwide digital currency, e.g. bitcoin, would change power positions and there would no longer be any gap between nations.

First of all, exchange rates would no longer exist as there would be no currency other than bitcoin, and people, companies and states would have no interest in investing capital to open

businesses or create new jobs places in foreign countries. There would be an internalisation of industries and poorer countries would become more poorer.

The Forex market, in which investors speculate on the appreciation and depreciation of currencies, would stop trading and the cost-of-living gap would be levelled out.

The advantages listed above in adopting Bitcoin as a single currency would be reiterated, as would the disadvantages.

Obviously, nations such as the US, UK, or the strong countries of the European Union would not like to adopt the world's single currency because they would lose their hegemony in the market, adding to this the fact that the Bitcoin system is a decentralised system and therefore no nation can control and dictate a price, everything is managed autonomously with the intersection of supply and demand.

Countries such as China have already placed restrictions against outside cryptocurrencies such as bitcoin, no longer recognising it as a system and banning conversion with the Chinese Yuan.

The new york time reports “China Banished Cryptocurrencies. Now, ‘Mining’ Is Even Dirtier.” (Tabuchi H., 2022)

5.6 Problem of common taxation

Should the Bitcoin cryptocurrency be adopted as the only international currency, there would be problems with taxation, as each country applies the rates that suit them.

For example, countries like Italy or Finland have a taxation that can reach up to 50 per cent, compared to states like the UAE where there are free-zones where one is tax-free.

“The Personal Income Tax Rate in Finland stands at 56.95 percent” (Trading Economics, 2022)

WAGE	< 15.000	15.000 - 35.000	35.000 - 55.000	55.000 - 75.000	75.000 - 95.000	95.000 - 225.000	225.000 - 435.000	435.000 >
TAX RATE	8%	10%	26%	34%	38%	42%	50%	53%

Self-produced table, data taken from (Hellsten R. 2018)

The adoption of a global digital currency is therefore virtually unlikely, precisely because the planet is divided into nations and each nation has its own way of operating.

The only plausible way forward is to introduce a second currency alongside the local one and give the possibility of transactions in all shops, allowing instant currency conversion.

5.7 Bitcoin adoption and public economy effects

Unlike normal currency, Bitcoin has no reference entity, due to decentralisation, it lives on the network with the help of computers connected to the Bitcoin network.

One major difference with normal money, managed by banks, is that it is supported by laws set by people, whereas Bitcoin is supported by strict mathematical laws written within an algorithm (blockchain). These mathematical laws are based on the fact that if a person has money to spend, they cannot be restricted in spending their money, so if they have the desire to buy something, no one can refuse that transaction, which is why bitcoin, in the past but also nowadays, is used to buy illicit items or finance crime.

If Bitcoin is adopted right now by the states of the world as their sole currency, the entire economy as we know it would be turned upside down.

First of all, the gap between countries with stronger currencies and others would be closed, companies would not move production to countries where the cost of living is lower as it would be the same all over the world, and then, most importantly, attempts at fraud would increase because money would no longer be protected by any state due to decentralisation. The security of blockchain technology does not allow for the recovery of lost money, either if it was mistakenly given to someone else, or if someone managed to get into a person's wallet and empty it.

Adopting Bitcoin, with the current conditions, would power countries to lose any monetary control they had until now.

The value of Bitcoin, like all existing cryptocurrencies, comes about through the intersection of market supply and demand.

Because of this, the price of the individual bitcoin will be very volatile and this would lead to a situation where the lack of stability of the currency would lead to unprecedented levels of poverty.

Therefore, the adoption of Bitcoin as a univa global currency may go some way to solving some issues such as inflation, the absence of an intermediary in transactions, but with the current system it would be more of a problem than a solution. Furthermore, in order to be able to make transactions using cryptocurrencies, one needs to know the right platforms to avoid running into scams, as if a transaction is made, it is not like a bank transfer that can be cancelled, the money is lost forever.

5.8 How Bitcoin could be adopted

The adoption of Bitcoin could only happen if the critical issues that this cryptocurrency brings are resolved.

Solutions that could be adopted could be:

- To simplify the storage of bitcoins in one's digital wallet, people need to remember their private keys to access their account. The private key is an alphanumeric strip that is

indispensable for accessing the wallet and forgetting it would result in the user no longer being able to access the account and therefore losing all the money in their possession. One solution would be to continue using blockchain technology by implementing the possibility of recovering the access key that can be forgotten or lost by the owner.

- Decrease the number of Exchange channels by placing a few state-certified ones, precisely to avoid running into scams.
- Activate insurance against fraud and the possibility of cancelling outgoing transactions made in error, perhaps by implementing double confirmation.
- Place a limit on the breakdown of bitcoin into satoshi, to avoid falling victim to deflation.
- Enhance proof of work technology to speed up the addition of blocks to the Bitcoin blockchain or sponsor the use of the Lightning Network to perform transactions.

The adoption of this monetary system would obviously lead the banks soon to bankruptcy or in the position of reinventing themselves; the states would also have large losses, which is why this step is not being considered for now.

The solution for a state could be to place fees on transactions that are made through bitcoins, but this would revert to having a third figure outside the transaction, thus undermining decentralisation, the aspect for which cryptocurrencies were created.

The public economy in poorer countries will initially benefit from adopting bitcoin as official currency, states like Venezuela, as mentioned earlier, besieged by unrelenting inflation will be able to breathe again, but the story will be different for states that have always had a strong currency like the US, UK and Europe.

The cost of living will be levelled out and there will no longer be any wage gap, in fact with a single digital currency, the price of e.g. bread will be the same all over the world.

Large companies will obviously come out less wealthy, as they will have no reason to invest capital in countries where labour is cheaper, in fact there will be an increase in the prices of consumer technology goods to cover the higher cost of labour and raw materials.

Many people think that the adoption of bitcoin could solve the much feared inflation problem, but they have not taken into account that life as we know it now, is based on the current economic/monetary system and therefore a currency revolution would inevitably lead to a drastic change in the way of life one has at the moment.

This monetary revolution can be compared to the transition from barter to paper money.

6. REPORT

6.1 Introduction

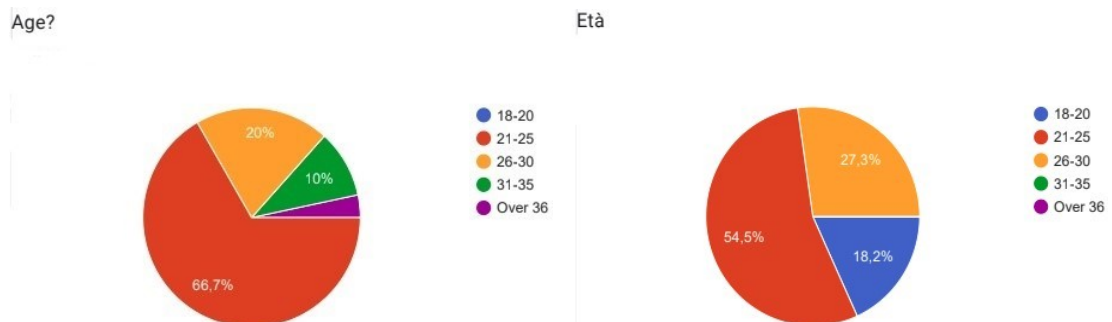
In order to understand people's general knowledge on the topic of cryptocurrencies, a questionnaire was administered to economics students at the University of Tampere in Finland and University of Eastern Piedmont in Italy.

The answers were very interesting and very helpful in understanding the thoughts of ordinary people, even those with an economic background, on this topic that has been on everyone's lips in recent years.

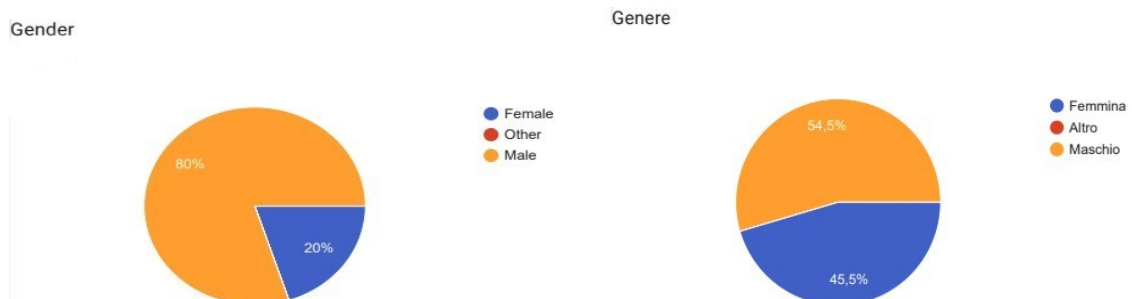
The answers will be analysed and compared in order to understand how students in two distinct countries such as Finland and Italy feel about whether or not to adopt cryptocurrencies, such as bitcoin, as a country's official currency.

6.2 Data Analysis

On the left are the student data from the University of Tampere and on the right those from the University of Eastern Piedmont

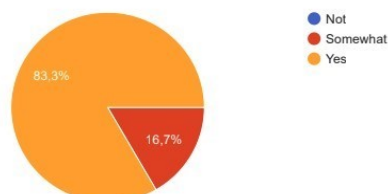


The majority of the students who responded to the questionnaire were aged between 21-25, for both universities, although a large proportion of 20-27% were aged between 26 and 30. Very curious is the data showing that, albeit in a small percentage, there are students over 36 years of age at the University of Tampere. On the other hand, at least as far as the questionnaire is concerned, no percentage is present in the Italian university.

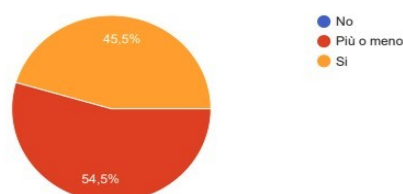


With regard to gender, there was a clear predominance of responses from male students over female students at the University of Tampere, whereas at the University of Eastern Piedmont, the gender percentage was around 50%, with male students slightly outnumbering female students.

Do you know what crypto currencies are?



Sai cosa sono le criptovalute?



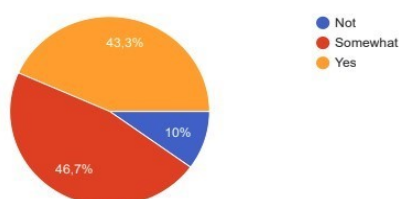
One of the most interesting data can be found in the third pie chart on the knowledge or lack of knowledge of cryptocurrencies.

83.3% of students at the University of Tampere claim to be familiar with cryptocurrencies, compared to 45% of economics students at the University of Eastern Piedmont.

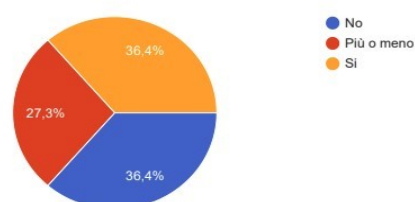
This is a very interesting fact, as one can see how this “cryptocurrency phenomenon” has led many people, especially in Finland, to document and inform themselves on the subject.

The graph also shows that there is not a single person who does not know what cryptocurrencies are, at most there is a general knowledge, not necessarily an in-depth one, but nevertheless all respondents have the topic in mind.

Do you know what block chain technology is?



Sai cos'e' la tecnologia block chain?



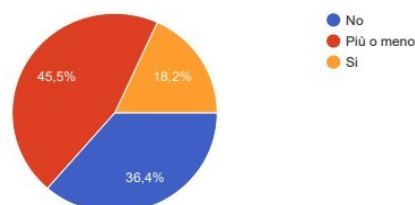
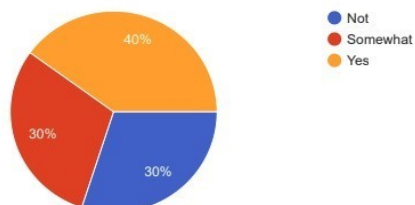
The fourth question concerning knowledge or lack of knowledge of blockchain technology led to results that are closely related to the previous question. In fact, if a large portion of the students at the University of Tampere had knowledge of cryptocurrencies, it can be observed that 43.3% know what blockchain is, or at least that they have heard of it and know that this technology is behind the functioning of cryptocurrencies.

As far as Italian students are concerned, it could be expected that most people did not know what blockchain is or what it is for, a fact closely related to the fact that most people, in the previous question, had answered that they had more or less no idea what a cryptocurrency was.

Knowing or at least understanding that blockchain technology is behind a cryptocurrency is already delving into the world of cryptocurrencies and understanding how they work.

Do you know the difference between a Wallet and an Exchange?

Conosci la differenza tra Wallet ed Exchange?



The question posed to the students on the difference between a Wallet and an Exchange was asked for a specific reason, namely to understand how many students have started researching how to invest in cryptocurrencies.

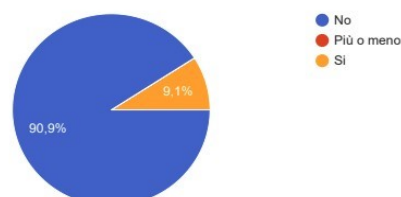
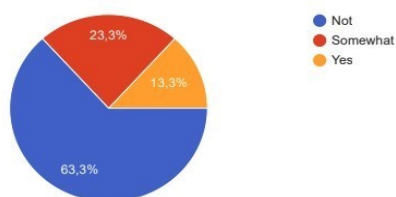
Wallets' are virtual accounts through which one can store one's cryptocurrencies such as bitcoins, whereas 'exchanges' are platforms through which one can carry out transactions such as investing and exchanging cryptocurrencies with other people.

Many times, exchanges also act as digital wallets.

The fact that 40 per cent of students at the University of Tampere and 18.2 per cent of students at the University of Eastern Piedmont know the difference between the two terms shows that most students who are informed about cryptocurrencies have also researched in depth how to invest in and use cryptos.

Do you use and/or invest in crypto currencies?

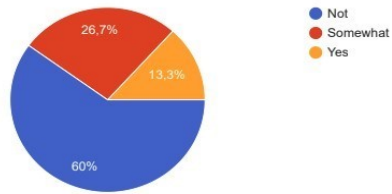
Utilizzi e/o investi in criptovalute?



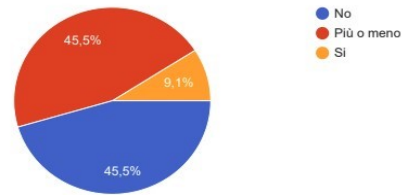
In the question on whether to use or invest in cryptocurrencies, the students of the University of Eastern Piedmont more than 90% answered that they do not believe in the cryptocurrency project, as did the students of the University of Tampere, who 63.3% decided not to invest in it.

This fact helps to understand how cryptocurrencies nowadays, despite the hype given by social media, are not very trusted and only a few brave, risk-averse people invest their time and money. On the other hand, the investment made by people is not necessarily made because they believe in the project behind the various cryptocurrencies, but may be made for purely speculative purposes.

Are you willing to invest in crypto currency?



Sei disposto a investire in cripto valuta?

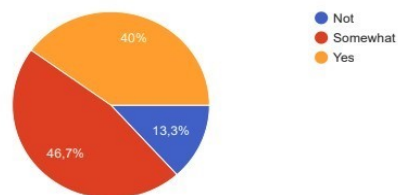


When asked “are you willing to invest in cryptocurrencies”, the percentage of “yes” from students at the University of Tampere as well as those at the University of Eastern Piedmont remained the same. Those who have invested in cryptocurrencies intend to continue on this path.

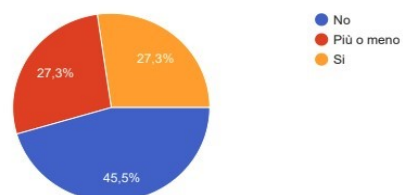
On the other hand, among the students of the University of Eastern Piedmont, a large segment is undecided whether to invest in it or not. On the other hand, the response of the students of the University of Tampere is clear: 60% do not believe and do not want to invest in it in the future.

A clear sign, again, of how high volatility leads people to place little trust in crypto.

Is crypto currencies an issue for energy consumption?



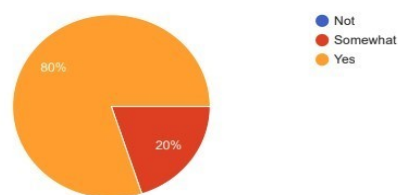
Le cripto valute sono un problema per il consumo di energia?



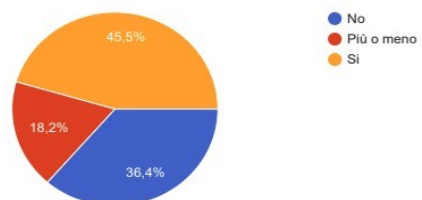
One of the main issues accompanying cryptocurrencies is the question of energy consumption.

The mining of cryptocurrencies and the operation of cryptocurrencies requires enormous energy consumption; in fact, one can see that the students at the University of Tampere, who are most knowledgeable about cryptocurrencies, answered “yes”, or at least 'somewhat', while the students at the University of Eastern Piedmont, answered mostly “no”.

Do you know what mining is?



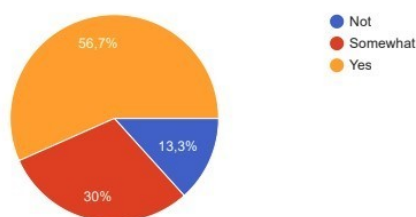
Sai che cos'e' il mining?



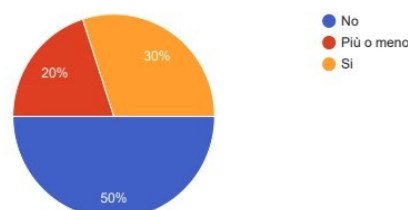
The question "do you know what mining is?" was asked to find out how many of those people who answered no to the previous question actually know how a cryptocurrency is created. All the students at the University of Tampere know what mining is or at least have heard of it, which explains the fact that only a small percentage think that this activity does not consume energy.

As far as students at the University of Eastern Piedmont are concerned, a large proportion of them do not know what mining is, which is why many answered "no" to the previous question.

Is mining activity an issue for the environment?



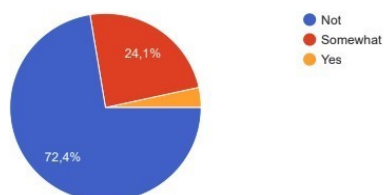
L'attività di mining è un problema per l'ambiente?



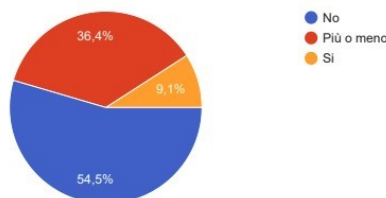
The high energy consumption caused by mining for most students at the University of Tampere is a problem that spills over into the environment, whereas for the students at the University of Eastern Piedmont, this activity does not cause any environmental damage.

A lack of knowledge and understanding of cryptocurrencies can lead one to think that since this new currency works digitally, energy production does not pollute in the same way as the production of traditional paper money. In a way it is true, deforestation for the production of banknotes has a heavy impact on the environment, but energy production also has a very heavy impact on the environment as energy production today is still done through nuclear power plants, coal and only a small percentage through renewable sources such as wind power and solar panels.

Is crypto currencies, such as bitcoin, safer than central bank money?



Le criptovalute, come il bitcoin, sono più sicure del denaro della banca centrale?



In the question "are cryptocurrencies safer than central bank money", there is a clear difference between the answers given by students at the two universities.

In both cases "no" prevails, but it is sharper in Finnish students than in Italian students.

This is a very interesting statistic as the percentage of those who invest more in cryptocurrencies goes to Finnish students, yet most of them do not believe that cryptocurrencies are a safer medium than traditional money.

Interestingly, among Italian students, the same percentage who invest in cryptocurrencies believe that they are safer than money controlled by the central bank. This shows how Italian students who invest in cryptocurrencies, do so because they believe in the project; on the other hand, Finnish students who invest in this asset, seem to do so purely for speculative purposes.

Does the price fluctuation of crypto currencies trouble you?

La fluttuazione dei prezzi delle criptovalute ti disturba?



The high fluctuation of cryptocurrency prices is one of the main reasons why people invest in this asset. The fact that the price can rise or fall quickly leads people to distrust crypto.

Most students at the University of Eastern Piedmont think that fluctuation is a problem; however, students at the University of Tampere are divided between those who are concerned and those who are not. In order to fully understand why these responses occur, an in-depth individual analysis is required, but as a general response, it is clear how this situation confuses people about this topic.

Do you believe that crypto currencies can replace the current monetary system in the future?

Pensi che le criptovalute possano sostituire l'attuale sistema monetario in futuro?



Linking to the question whether cryptocurrencies are safer than traditional currency, in the question "do you believe that crypto currencies can replace the current monetary system? ", there was more or less the same result.

Italian students believe in a future compared to Finnish students.

This is a very interesting fact, as proportionally Finnish students, who invest more, are more informed on the subject than Italian students, believe less in a monetary revolution with cryptocurrencies.

Can inflation be defeated by crypto currencies like bitcoin?

L'inflazione può essere sconfitta da criptovalute come bitcoin?



The answers given to the question "Can inflation be defeated by cryptocurrencies like bitcoin?" led both factions, the Italian and the Finnish, to agree. In fact, most Italian and Finnish students agree that cryptocurrencies are not the solution to fight inflation. Adding to this the fact that using cryptocurrencies to fight inflation would create the opposite problem, that of deflation.

Topic explained in detail within the thesis.

Would you support taking bitcoin as the official currency of Finland?

Sopporteresti l'assunzione di bitcoin come valuta ufficiale in Italia?



The question about the adoption of a cryptocurrency, e.g. bitcoin, as an official currency in Italy or Finland, the majority of students of the two universities answered "no".

Both Italian and Finnish students would not accept the replacement of the traditional monetary system with cryptocurrency. Almost all Finnish students would not accept this, most Italian students would not accept it either, but there is a generous percentage who are undecided on what to do.

When asked about the positives and negatives of cryptocurrencies, almost everyone agrees that there are more disadvantages than advantages in using it and how energy consumption, high price instability and the total absence of a supervisory body restrain people from believing that this new way of conceiving money could become a reality in the future.

CONCLUSIONS

Summary

The aim of this thesis, which I hope has been achieved, is to provide an insight into the functioning and adoption of cryptocurrencies in today's economic system by analysing cryptocurrencies such as bitcoin and the technology revolving around it.

My time spent researching information on this topic led me to realise that cryptocurrencies are a very complex subject that requires knowledge in numerous areas, such as mathematics, computer science and economics, in order to fully understand them.

Despite the in-depth study I did in order to write this thesis, I am of the opinion that I still do not have the full knowledge of this subject, as it is subject to very frequent updates.

Obviously, cryptocurrencies are an innovative idea of electronic money that utilises existing technologies such as cryptographic techniques and the introduction of blockchain technology, which allows the storage of one's own data without the help of a central authority to function.

Because of this, the entire system needs constant updates from both a technical and economic point of view. In this sense, the world of cryptocurrencies already has a significant market capitalisation and their value fluctuates dramatically in a short period of time, rising or falling depending on supply and demand in the market.

Due to their price volatility, cryptocurrencies do not yet seem suitable to replace traditional currency and that is why they are not used by many people. However, the blockchain technology behind their operation is very interesting as it can be applied in many different areas.

Cryptocurrencies can be a good starting point to understand the real potential of this technology and in the future, create even better systems and apply them in other areas.

It is impossible to reach a clear-cut opinion on the case of cryptocurrency adoption within the economic system as it is subject to frequent updates that can change the game.

It is still too early to give a final verdict on whether or not cryptocurrencies should be adopted as a country's official currency or global currency. The constant updates and instability caused by the drastic price fluctuations of the various cryptocurrencies do not guarantee security for the people and states that would like to adopt it as an official currency.

At the end of this thesis, for sure new cryptocurrencies will surely have come out that promise to solve many problems; countries will decide to adopt them or ban them in their territory, or a system will be found to be able to produce more clean energy for maintaining and mining cryptocurrencies such as bitcoin that require huge amounts of energy.

The list could go on and on, but only the future will bring clarity on this subject.

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