



PEOPLE'S DEMOCRATIC REPUBLIC OF
ALGERIA
MINISTRY OF HIGHER EDUCATION AND
SCIENTIFIC RESERACH



MOHAMED KHIDER UNIVERSITY OF
BISKRA
FACULTY OF ECONOMICS, COMMERCE
AND MANAGEMENT SCIENCES
DEPARTMENT OF COMMERCE

TRADING WITH CRYPTOCURRENCIES ON ELECTRONIC PLATFORMS

Case Study: "Bitcoin" an application on tradingview platform

Dissertation submitted in partial fulfillment of the requirements for the degree of master in
commercial sciences

OPTION: FINANCE AND INTERNATIONAL TRADE

Submitted by:

- ❖ Belbel Mohamed Aymen
- ❖ Hadj Brahim Dhia Eddine

Supervised by:

Kamilia Izzrech

Board of the examiners

<i>Guechari Yasmina</i>	<i>MCA</i>	<i>Mohamed Khider University</i>	<i>Chairperson</i>
<i>Kamilia Izzrech</i>	<i>MAA</i>	<i>Mohamed Khider University</i>	<i>Supervisor</i>
<i>Farid Benabid</i>	<i>MCA</i>	<i>Mohamed Khider University</i>	<i>Examiner</i>

Academic Year: 2021/2022

Content

List of content.....	I
List of figure.....	III
List of tables	V
Acknowledgement.....	VI
Abstract	VII
Introduction	1
1) Research problem	1
2) Hypothesis of the study	1
3) Importance of the thesis.....	2
4) Previous studies	2
5) Study structure.....	3
Chapter 1Cryptocurrencies	
1-1 Cryptocurrencies review	5
1. Definition of crypto currencies.....	5
2. Advantages and disadvantages of crypto.....	5
3. coins and tokens	6
1-2 BLOCKCHAIN TECHNOLOGY	7
1. understanding Blockchain Technology	7
2. Characteristics of blockchain.....	8
1-3- Types of Crypto-currencies: Bitcoin and Ethereum	9
A. Bitcoin	9
1. Definition of Bitcoins	9
2. Some history about Bitcoin	9
3. Bitcoin's Price	10
B. Etheurum.....	11
1. Definition of Ethereum	11
2. The Birth of Ethereum.....	12
3. learning Ethereum.....	12
C. comparison between Bitcoin and Ethereum	13
Chapter2: E-trading and the electronic platforms	
2-1- The electronic trading	14
1. Date of appearance	14
2. Advantages and disadvantages of online trading	15
3. trader and investor profiles	17
2-2 The electronic platforms	17

1. Basics of Trading Platform	17
2. the digital wallet	18
3. Creating a blockchain wallet	18
4. Most common platforms for exchanging crypto	20

Chapter 3

Important steps to Trade with cryptocurrencies (The Analysis)

3-1 fundamental analysis	24
3-2 Technical analyses	26
1. Japanese candles	26
2. Basics (trend line / time frame / the spread /the bips/the range)	28
3. Support and resistance	32
4. Trading indicators (macd , Bollinger band, stochastic	34
5. Triangles	40
6. technical models patterns	44

Chapter4

Empirical Research

Case study of tradingview

4-1- Exploratory studies to the trading view	46
1. Introduction to trading view	46
2. analysis Priorities.....	47
4-2 Empirical research.....	49
1. the effect of the Japanese candlesticks on the market	49
2. the effect of the Trading indicators and the technical models P in the market.....	52
3. the technique to sell and buy crypto with Binance.....	60
4-3: discussion	63
1. Test hypotheses	63
Conclusion.....	65
References	66

List of figures

Figure 1: general research model.....	4
Figure 2: bitcoin price from trading view.com	11
Figure 3: NASDAQ price evolution from ctrader	15
Figure 4: The official blockchain’s website https://www.blockchain.com	19
Figure 5: blockchain wallet from blockchain.com.....	19
Figure 6: verification email icon from blockchain.com	20
Figure 7: the appearance of the blockchain wallet from blockchain.com	20
Figure 8: Japanese candlestick bars from (nison, 2001, p. 25).....	26
Figure 9 Japanese Candlestick Patterns (Iamo, 2021).....	27
Figure 10 Russell price data (CHEN, Trading Platform, 2021)	28
Figure 11 the time frame in tradingview.com.....	29
Figure 12: the spread in BTCUSDT market in tradingview.com	30
Figure 13 the bips in BTCUSDT market in tradingview.com.....	31
Figure 14: example of trading range (HAYES, Trading range, 2021)	32
Figure 15 example of trading range (HAYES, Trading range, 2021)	32
Figure 16: the support and resistance lines in eth/teth market from tradingview.com	33
Figure 17: trading tools indicators – MACD (FERNANDO, 2022).....	34
Figure 18: trading tools indicators – MACD (FERNANDO, 2022).....	35
Figure 20: Bollinger band indicator from tradingview.com	36
Figure 21: Bollinger band indicator (squeeze) from tradingview.com.....	37
Figure 22: Bollinger band indicator (breakout) from tradingview.com	37
Figure 23: stochastic oscillator (HAYES, Stochastic Oscillator, 2021).....	39
Figure 24: Ascending triangle by Julie bang investopedia.com	41
Figure 25: Descending triangle by Julie bang investopedia.com	42
Figure 26: Symmetrical triangle by Julie bang investopedia.com	43
Figure 27: Triangles patterns Types by Julie Bang investopedia.com.....	43
Figure 28: head and shoulders patterns example.(HAYES, Head and Shoulders Pattern, 2022).....	44
Figure 29: cup and handle patterns example. (CHEN, Cup and Handle Definition, 2022).....	45
Figure 30: the tradingview platform overview from tradingview.com.....	46
Figure 31: the market Bitcoin/Tethers from tradingview.com	46
Figure 32 the time frame in tradingview.com.....	47
Figure 33: the spread on bitcoin/tether us market from tradingview.com.....	47
Figure 34: the bips in BTCUSDT market in tradingview.com.....	48
Figure 35: doji candle in BTC/USDT market chart from tradingview.com	49
Figure 36: dark cloud cover candlestick in BTC/USDT market chart from tradingview.com	50
Figure 37: hammer candle in BTC/USDT market chart from tradingview.com.....	51
Figure 38: hanging man candlestick in BTC/USDT market chart from tradingview.com	51
Figure 39: MACD Crossover in BTC/USDT market from tradingview.com	52
Figure 40: Bollinger band in BTC/USDT market from tradingview.com.....	53
Figure 41: Bollinger band indicator (squeeze) from tradingview.com.....	53
Figure 42: Bollinger band indicator (breakout) from tradingview.com	54
Figure 43: the role of the symmetrical triangle for changing the course of the curve from tradingview.com.....	55
Figure 44: the role of the descending triangle for changing the course of the curve from tradingview.com	56
Figure 45: the role of the descending triangle for changing the course of the curve from tradingview.com	56
Figure 46: the role of the ascending triangle for changing the course of the curve from tradingview.com	57
Figure 47: the role of the head and shoulders patterns for changing the course of the curve from tradingview.com.....	58

Figure 48: the role of the head and shoulders patterns for changing the course of the curve from tradingview.com..... 58

Figure 49: the role of the cup and handle patterns for changing the course of the curve from tradingview.com..... 59

Figure 50: the role of the cup and handle patterns for changing the course of the curve from tradingview.com..... 60

Figure 51: trade with cryptocurrencies in Binance from Binance.com..... 60

Figure 52: the market chart from binance.com 61

Figure 53: example of trading BTC/USDT with limit order from Binance.com 62

Figure 54: example of trading BTC/USDT with market price from Binance.com..... 62

Figure 55: BTC-ETH correlation from (MAGAS, 2020)..... 63

Figure 56: relationship between BTC and ETH price movements from (MAGAS, 2020) 64

List of tables

Table 1: advantages and disadvantages of cryptocurrencies from (FRANKENFIELD, 2022).....	6
Table 2: Advantages and disadvantages of these platforms from (10 Best Crypto Exchanges & Platforms of May 2022, 2022)	22

Acknowledgement:

First of all, we like to thank ALLAH, the Most Merciful, and Most Compassionate, who guided us in the right direction and gave us the full strength to complete this dissertation.

Second, while there are numerous individuals' people that we acknowledge for encouragement during our academic career, we are dedicating this work to our mothers and fathers for several reasons. The way they instilled in us the value of education and providing us a home atmosphere and resources that prioritized learning. They motivated us to learn more than what was required in school ever since when we were childrens and established a family understanding that education matters the most. They gave us their trust to decide and make our way through life.

We would also like to take this good opportunity to express our thankfulness to our supervisor Miss. kamilia Izzrech for research guidance and assistance, Miss. Djoudi hanane the Dean of faculty for believing in us and gave us the chance to make our dissertation in English.

And also me "Aymen Belbel" I will mention my dearest grandmother "mekhalfia merzaka" who always motivated me and prayed for me and wishes for me all the best.

Work as hard as you can and then be happy in the knowledge you couldn't have done any more

ABSTRACT:

Bitcoin and other prominent cryptocurrencies have gained much attention since the last several years. Globally known as digital coin and virtual currency, this cryptocurrency is gained and traded within the blockchain system. This dissertation aims to investigate the essence of the cryptocurrencies and discern the impact of the technical analysis to anticipate the coin market direction in tradingview platform as a study case. It has been assumed that the cryptocurrency is the future currency that might replace the current paper currency worldwide. Despite the interest in cryptocurrency trading has caught the attention of users, many are not aware of its opportunities, drawbacks and challenges for the future. Researches on cryptocurrencies Research on cryptocurrency has evolved. We will provide assistance through substantial dissertation to the technical and fundamental analyses. And based on the results we will deduce that the cryptocurrency is expected to be the currency of the future.

Key words: cryptocurrencies, bitcoin, blockchain technology, technical analyses, indicators, trading, investing, ethereum.

ملخص :

اكتسب البيتكوين وغيره من العملات المشفرة البارزة اهتمامًا كبيرًا منذ السنوات العديدة الماضية . تُعرف هذه العملة المشفرة عالميًا باسم العملة الرقمية والعملية الافتراضية ، ويتم اكتسابها وتداولها داخل نظام البلوكشين. تهدف هذه الرسالة إلى التحقيق في جوهر العملات المشفرة وتمييز تأثير التحليل الفني لتوقع اتجاه سوق العملات في منصة تريند فيو كحالة دراسة. تم افتراض أن العملة المشفرة هي العملة المستقبلية التي قد تحل محل العملة الورقية الحالية في جميع أنحاء العالم. على الرغم من الاهتمام بتداول العملات المشفرة قد جذب انتباه المستخدمين ، إلا أن الكثيرين لا يدركون فرصه وعيوبه وتحدياته للمستقبل. قد تطور البحث عن العملات المشفرة سنقدم المساعدة من خلال أطروحة كبيرة للتحليلات الفنية والأساسية وبناءً على النتائج، سوف نستنتج أنه من المتوقع أن تكون العملة المشفرة هي عملة المستقبل...

الكلمات المفتاحية: العملات المشفرة ، البيتكوين ، تقنية البلوكشين ، التحليلات الفنية ، المؤشرات ، التداول ، الاستثمار ، ايثريوم.

Introduction

We all know the trade as the exchange of a commodity for a commodity, a service for a service, or a commodity for a service in a specific place with the presence of an intermediary. But recently in the twenty-first century, it seems that a new type of commerce has become more prevalent that called the electronic trade using electronic money, virtual money or what is called cryptocurrency. Electronic trading or E-commerce has become more and more prevalent in the first world, because it costs a lower fees and it is more control and flexibility. Cryptocurrencies are based on blockchain technology. All this is new in the economy but cryptocurrency like Bitcoin and Ethereum are very popular. Recently, it involved a lot of consideration in socio-economic, financial circles and many people and influencer talk about it on social media. Many believe that it is the future that we should think of.

Our dissertation is about trading with crypto currencies in electronic platforms. The premise is that people are new to cryptocurrencies. So we will give a full overview about it and how it works, in order to have a better understanding about the trading material. In general, Cryptocurrencies use a number of terms; from the term ‘coin’ to the term ‘blockchain,’ to even the concept of ‘payment’ and ‘ownership,’ none of these terms are used in the way they used to mean. This study discussed the reason for this, and it also mentioned the appearance of the blockchain technology. It also explained the techniques and tools we use to trade with these coins to enter the electronic market competently and confidently.

This study highlights how investors can find opportunities and even use algorithms to trade rapidly, instead of manually clicking the buy or sell button, or manually drawing lines and charts to anticipate movements.

People want to trade Cryptocurrencies not because it is trendy, but because it is the latest money-making potential that rivals the early days of Wall Street, and the Forex market. It is a market that naturally lends itself to electronic trades, and thereby makes entry and exit fluid and efficient.

Trading with crypto also may hold a loss. Nothing is guaranteed and, in fact, the chances of we losing money in trading with crypto is very high if the users do not know the methods and strategies of trading. That is the perspective we used in our dissertation. We are going to come at it from the perspective of losing money and set up all the necessary tools, strategies, and skills needed to prevent that from happening. (Quest, 2018, p. 162)

This study took the electronic platforms also as a consideration and the perfect way for picking a platform to start trading specifically.

After discussion all the previous elements, this dissertation start to look at the strategies needed to navigate the market and the sentiment, by using technical analysis to determinate the market direction.

Research problem:

A research question is crucial in determining the method of trading with crypto currency on electronic platforms and its outcomes. In order to achieve the objective of this study, we search to answer the following question:

How to make benefit from trading with cryptocurrency on electronic platforms?

Besides, to strengthen the main question of this study, we studied the following questions:

Q1: What is cryptocurrency and how does it work?

Q2: What is the trading platform?

Q3: How does an electronic trade work?

Q4: what is the future of trading with cryptocurrencies?

Hypotheses of study:

Ho1: The cryptocurrencies include cheaper money transfers.

Ho2: Bitcoin have the potential of becoming a universal currency.

Ho3: Bitcoin and the Ethereum are related.

Ho4 Technical analysis is not mandatory to determine the direction of the market.

Importance of the dissertation:

Our dissertation derives its importance from its scientific and practical application, where it stems from the attempt to enrich the studies and research conducted in the field of trading with cryptocurrencies which it is really important in the new generation and it is not going to disappear, or be limited to 100 years, and it is not so difficult and it's faster than the other trades without a risk of data being scammed.

The study also draws on clarifying the importance of the technical analysis and how could help the traders to trade in the best way.

Previous studies:

- 1) Study of **Robert Hudson & Andrew Urquhart (2019)** an article entitled “**Technical trading and cryptocurrencies**”

This study carried out a comprehensive examination of technical trading rules in cryptocurrency markets, using data from two Bitcoin markets and three other popular cryptocurrencies. They employ almost 15,000 technical trading rules from the main five classes of technical trading rules and find significant predictability and profitability for each class of technical trading rule in each cryptocurrency. They find that the breakeven transaction costs are substantially higher than those typically found in cryptocurrency markets. They also show that the technical trading rules offer substantially higher risk-adjusted returns than the simple buy-and-hold strategy, showing protection against lengthy and severe drawdowns associated with cryptocurrency markets.

- 2) Study of **Fan Fang, Carmine Ventre, Michail Basios, Leslie Kanthan, David Martinez-Rego, Fan Wu & Lingbo Li (2022)** an article entitled “**Cryptocurrency trading: a comprehensive survey**”

This study provided a comprehensive survey of cryptocurrency trading research, by covering 146 research papers on various aspects of cryptocurrency trading (*e.g.*, cryptocurrency trading systems, bubble and extreme condition, prediction of volatility and return, crypto-assets portfolio construction and crypto-assets, technical trading and

others). This study also analyses datasets, research trends and distribution among research objects (contents/properties) and technologies, concluding with some promising opportunities that remain open in cryptocurrency trading.

3) Study of **Adrian Heinz, Mohamed Jamaloodeen ,Atul Saxena, Lissa Pollacia (2019)** PHD thesis entitled “**Bullish and Bearish Engulfing Japanese Candlestick patterns: A statistical analysis on the S&P 500 index**”

This study focused on the chart style known as Japanese candlesticks, which relies on four pieces of information for every session: Open, High, Low and Close prices. It is believed that some candle patterns possess predictive capabilities that can alert investors of imminent price tops, bottoms, or price trend continuations. For this study, they performed a statistical analysis, using historical prices of the S&P 500 index, of the effectiveness of Bullish Engulfing and Bearish Engulfing patterns, which are believed to forecast bottoms and tops respectively. Results indicate that the Bearish Engulfing provide strong short-term forecasting power when using the Open and High criteria but not the Close criterion. Likewise, the Bullish Engulfing offered strong short-term forecasting power when using the Open and Low criteria but not the Close criterion

What distinguishes this study from previous studies?

Our study and the previous studies agree about what is cryptocurrency and how does it work?

But it differs from previous studies in the application environment, where our study was applied on the tradingview platform as a study case, that we discovered the roles of indicators and their importance to determine the direction of the market curve

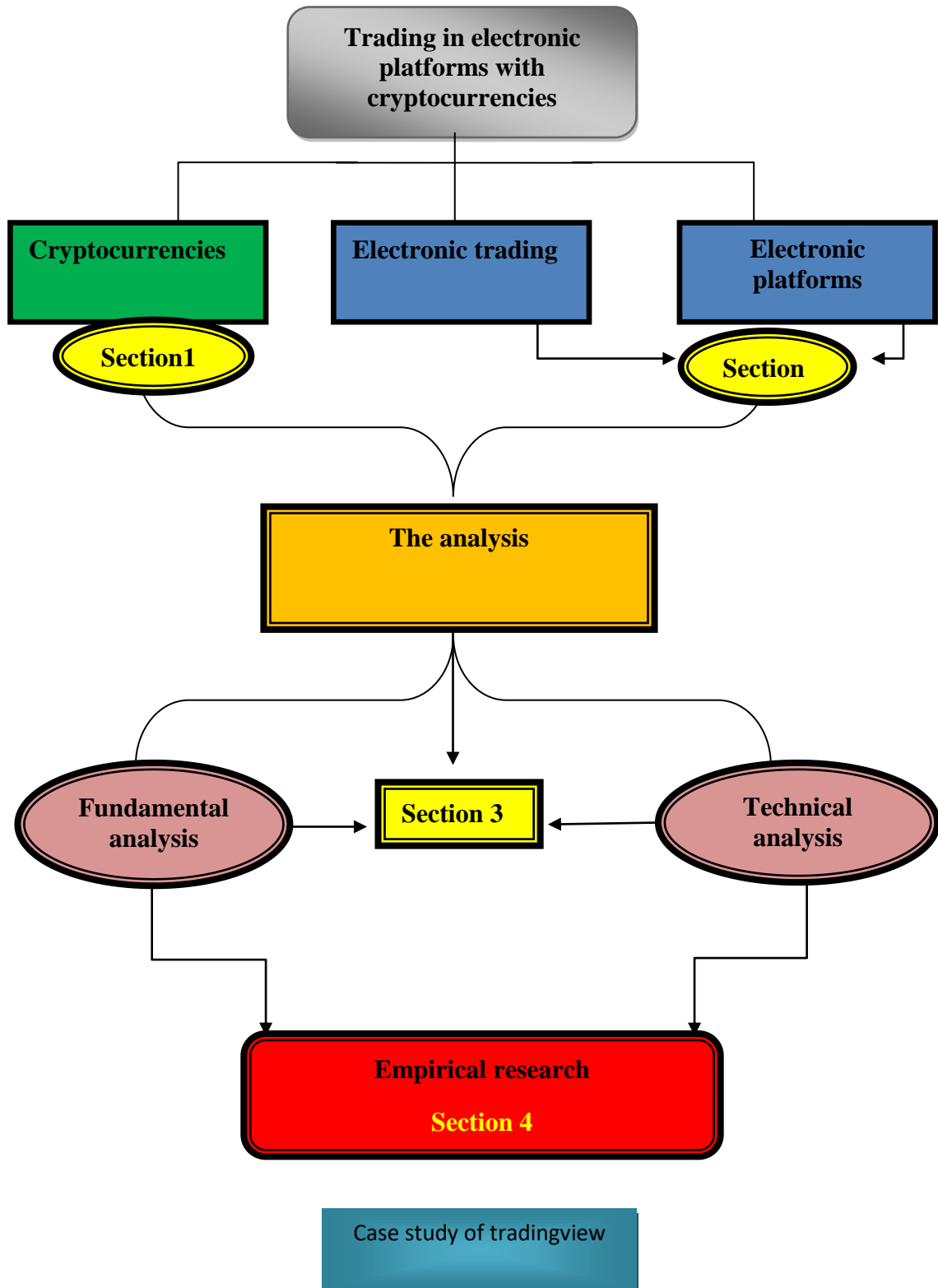
The study also differs in determining the effect of the technical analysis to determine the direction of the market

The study structure:

Based on the research problem, a hypothetical model was built to show how we answered our problem “**How to make benefit from trading with cryptocurrency on electronic platforms?**” and its elements includes what was covered in the research.

The study structure is in next figure.

Figure 1: general research model



Chapter 1: Cryptocurrencies

1-1 – Cryptocurrencies review

Cryptocurrencies and Blockchain, Bitcoin, Ethereum are fascinating to us because there are so many elements to understand. In the first chapter we tried to attempt to cover the basics.

Cryptocurrency, or crypto for short, is an electronic form of currency that allows the transmission of value between two nodes on a network. There are two specific networks that should get familiar with, because they are currently the most widely known and the ones with the most activity. Fair warning: that could change over time. But as long as the understanding of the basics, it doesn't matter what the branding is. The first network is the Bitcoin network and the second is the Ethereum network

1. Definition of cryptocurrencies

Cryptocurrencies are digital currencies which can be used to digitally transfer money to another person safely, without having to use intermediaries or trusted third parties, like a bank or Visa, e.g., to verify that we must have sent the money and the money is now no longer ours. We want to read that sentence again, slowly. In addition, it does much faster at a fraction of the cost because it does away with unnecessary and expensive transaction fees. (FRANKENFIELD, 2022)

According to the dictionary of (Cambridge, 2022) cryptocurrency is a digital currency produced by a public network, rather than any government, that uses cryptography to make sure payments are sent and received safely

2. Advantages and Disadvantages of Cryptocurrency

Cryptocurrencies were introduced with the intent to revolutionize financial infrastructure. As with every revolution, however, there are tradeoffs involved. At the current stage of development for cryptocurrencies, there are many differences between the theoretical ideal of a decentralized system with cryptocurrencies and its practical implementation.(FRANKENFIELD, 2022)

Some advantages and disadvantages of cryptocurrencies are summarized in table 1

Table 1: Advantages and disadvantages of cryptocurrencies (MitevaKacarski, 2017)

Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ the application of the same algorithms that are used in online banking ▪ the disclosure of information about the users in Internet banking ▪ the Transparency in all information about the transaction in the BTC network ▪ no data about the recipient or the sender of the coins ▪ No inflation – the maximum number of coins is strictly limited by 21 million Bitcoins ▪ Peer-to-peer cryptocurrency network «in such networks there is no master server, which is responsible for all operations". ▪ All the wallets installed by users’ program are part of a bitcoin network. ▪ Each client stores a record of all committed transactions and the number of bitcoins in each wallet. ▪ Transactions are made by hundreds of distributed servers ▪ Neither banks or taxes, nor governments can control the exchange of money between. ▪ Decentralization. There is no central control authority in the network ▪ each computer mining bitcoins is a member of this system ▪ in case of the network goes offline, the payment system will continue to operate stable. ▪ Easy to use 	<ul style="list-style-type: none"> ▪ Strong volatility – almost all of the ups and downs of the BTC value depend directly on the declared statements of the governments of different countries. ▪ Large risks of investing in cryptocurrency that should be considered in the medium and long term. ▪ related to risk of money laundry, terrorist and other illegal activity financing ▪ lack of a central issue, which means that there is no legal formal entity to guaranty in case of any bankruptcy, and alike ▪ it is very difficult to predict ▪ many academics and professionals of this topic claim that the future of cryptocurrencies is bright since it will remove trade barriers and intermediaries ▪ the thoughts of decreasing the cost of transactions ▪ the high risk of volatility ▪ ,hacking risks ▪ and lack of institutional backup makes the future of cryptocurrencies not very optimistic

3. Coin and Token

a- Crypto Tokens:

Tokens exist in a digital record on the blockchain. But tokens aren't money, as money is typically understood. Instead, they represent things. Often a digital token represents physical or intellectual property, such as a work of art, a piece of music or a book. The best-known example of this is the non-fungible token or NFT. (streissguth, 2022)

b- Crypto Coins:

New coins are constantly being created, such as Dogecoin, Litecoin, Tether and Cardano. No matter the name, their purpose is the same. They provide a store of value and medium of exchange. New and different forms of tokens are also coming into existence, but their purpose varies. The owner of a transactional token can use it to transfer money, to avoid steep bank fees. A governance token would allow voting, as a citizen, a board member or a shareholder. (streissguth, 2022)

1-2- Blockchain Technology

1. understanding Blockchain Technology

'Blockchain technology,' or commonly started just 'blockchain,' in many different contexts, and it can be confusing because different people use the words to mean different things. Purists will have a different understanding of the word from generalists. In general, technologists and computer scientists are more precise with their terminology than journalists, who write for the layman. In the following, we present a broad overview of blockchain technology and then explain some of the nuances. By now, the will of knowing that there is no such thing as 'the blockchain,' just as there is no such thing as 'the database' or 'the network'. ETH is the Ethereum blockchain, a reference to the public Ethereum transaction database—but also creating private Ethereum blockchains by simply running some node software on some machines and having them connect to each other. The private Ethereum network will create its own blockchain, and the miners will mine ETH just like in the public network. Our private ETH will not be compatible with the public ETH because the private Ethereum network has a different history from the public version. (LEWIS, 2018, p. 305)

If people like hierarchies, blockchains fall under the broader category of 'distributed ledgers'. All blockchains are distributed ledgers, but they can have distributed ledgers that don't have blocks of data chained together and broadcast to all participants. Sometimes journalists and consultants inaccurately use the term 'blockchain' when they are describing non-blockchain distributed ledgers. The guessing is that 'distributed ledgers' is too much of a mouthful whereas 'blockchain' is a nice memorable buzzword. There are a need to differentiate between blockchain technologies and specific blockchain ledgers. Blockchain technologies are the rules or standards for how a ledger is created and maintained. Different technologies have different rules for participation, different network rules, different specifications for creating transactions, different methods of storing data, and different consensus mechanisms. When a network is created, the blockchain or ledger of record is initially empty of transactions, just as a new physical leather-bound ledger is

empty. Some example blockchain technologies are: Bitcoin, Ethereum, NXT, Corda, Fabric, and Quorum. Blockchain ledgers themselves are specific instances of ledgers that contain their respective transactions or records. Think of normal databases. Anyone probably heard of a few types or flavors of databases—Oracle databases, MySQL databases, perhaps others. Each flavor works slightly differently though they all have similar goals: efficient storage, sorting, and retrieval of data. There are multiple instances of the same type of database: a company might use more than one Oracle database. And so it is with blockchains. Some blockchain technologies operate one way, others operate a slightly different way and we can have multiple instances of any blockchain technology, in separate ledgers. (LEWIS, 2018, p. 306)

2. Characteristics of Blockchain

According to (LEWIS, 2018, p. 311) the Blockchains usually contain the following concepts:

- a.** A data store (database) that records changes in the data. Up to now they have most commonly been financial transactions, but people are able to store and record changes to any kind of data in a blockchain.
- b.** Replication of the data store across a number of systems in real time. ‘Broadcast’ blockchains, such as Bitcoin and Ethereum, ensure that all data is sent to all participants: everyone sees everything. Other technologies are more selective about where data is sent.
- c.** ‘Peer-to-peer’ rather than client-server network architecture. Data may be ‘gossiped’ to neighbors rather than broadcast by a single coordinator acting as the golden source of data.
- d.** Cryptographic methods such as digital signatures to prove ownership and authenticity, and hashes for references and sometimes to manage write-access.

The blockchain technology has described as ‘A collection of technologies, a bit like a bag of Legos’. The possibility of taking a different bricks out of the bag and put them together in different ways could create different results.

Sometimes when discussing specific potential uses for this technology, this exchange appears:

‘But, there is no need for the blockchain to do that. The traditional technology could replace it!’

‘Oh, some data storage, some peer-to-peer data sharing, cryptography to ensure authenticity, hashes to ensure data tampering is evident etc’.

‘But the blockchains work had been described!’

So blockchains are not themselves a new invention, but instead, they put together existing technologies to create new capabilities. (LEWIS, 2018, p. 312)

1-3- Types of Crypto-currencies: Bitcoin and Ethereum

A. Bitcoin

People refer to Bitcoin as a digital currency, virtual currency, or cryptocurrency, but it may be easier to think of it as an electronic asset. The word currency often side-tracks people when they are trying to understand Bitcoin. They get caught up trying to understand aspects of conventional currencies which do not apply to Bitcoin. Bitcoin is also sometimes described as a digital token. (LEWIS, 2018, p. 149)

1. Definition of bitcoin

Bitcoins are digital assets ('coins') whose ownership is recorded on an electronic ledger that is updated (almost) simultaneously on about 10,000 independently operated computers around the world that connect and gossip with each other. This ledger is called Bitcoin's blockchain. Transactions that record transfer of ownership of those coins are created and validated according to a protocol—a list of rules that define how things work and which therefore govern updates to the ledger. This protocol is implemented by software—an app—that participants run on their computers. The machines running the apps are called 'nodes' of the network. Each node independently validates all pending transactions wherever they arise, and updates its own record of the ledger with validated blocks of confirmed transactions. Specialist nodes, called miners, bundle together valid transactions into blocks and distribute those blocks to nodes across the network. (LEWIS, 2018, p. 150)

Even though (Sparkes, 2022) state that the bitcoin is a digital currency which operates free of any central control or the oversight of banks or governments. Instead it relies on peer-to-peer software and cryptography.

2. Some history about Bitcoin

Satoshi was the author of the Bitcoin whitepaper and was active on cypherpunk mailing lists where like-minded people discuss ways of reclaiming personal privacy in the electronic age. After publishing the original whitepaper, Satoshi continued to participate on Bitcoin forums until December 2013, and then vanished. And he also owned or controls a significant number of Bitcoins, estimated in 2013 by cryptocurrency security. This represents just fewer than 5% of the total 21m Bitcoins that will ever be created, if the protocol rules don't change. At 2018, prices of around \$10,000 per Bitcoin, this puts the nominal value of the Bitcoins controlled by Satoshi at \$10bn. If Satoshi ever moves any bitcoins thought to be associated with him/her, the community would immediately find out. The transactions would be visible on the blockchain and addresses thought to be associated with Satoshi are monitored. This would almost certainly affect the price of Bitcoin (LEWIS, 2018, p. 236).

In 2007 a pseudonymous Satoshi Nakamoto began working on Bitcoin. After that in 2008 the website bitcoin.org was registered using anonymousspeech.com, a broker that registers domains on behalf of customers who can choose to remain anonymous. This shows how important privacy was to the person or group involved in Bitcoin. The Bitcoin whitepaper, written under the pseudonym Satoshi Nakamoto, was released on an obscure but fascinating mailing list metzdowd.com that is much loved by cypherpunks. Wikipedia has

this to say about cypherpunks. On the beginning of 2009 the genesis (first) block was mined and the first Bitcoin payment was made from Satoshi's address to Hal Finney's address in block 170 (LEWIS, 2018, pp. 199-200).

After 2 years exactly on 6 Aug 2013 Bitcoin was classified as a currency by a judge in Texas, and the Bitcoin's price became searchable through Bloomberg software, which is popular with traders in traditional financial markets. Then Richard Branson, the owner of Virgin Galactic, announced he would accept bitcoins as payment for a flight to space. (LEWIS, 2018, p. 212).

There have been a number of high profile attempts at exposing Satoshi's identity. These are known in the industry as 'doxxings': the public revelation of an internet nickname's real-world identity. It is however highly unlikely that the real truth about Satoshi's identity is among these doxxings. On 14 March 2014, a cover article for Newsweek magazine claimed that Satoshi was a sixty-four-year-old Japanese gentleman named Dorian Nakamoto (birth name Satoshi Nakamoto) living in California. The article printed the suburb where Dorian lived and included a photograph of his house. This led to repeated harassment of Dorian and his family over the course of the next few weeks. (LEWIS, 2018, p. 237)

Our bet is that Satoshi Nakamoto is not an individual but a pseudonym for a group of people who have similar political views and who wish to remain anonymous. Craig Wright may have been part of that team. The team may not even know each other's real-world identities. Some of the team may have died since Bitcoin's popularization. We may get another clue in 2020 when the roughly 1 million BTC locked in the Tulip Trust will be accessible. The Tulip Trust is a trust fund supposedly created by Dave Kleiman, an associate of Satoshi. It contains early Bitcoins potentially owned by Satoshi. (LEWIS, 2018, p. 238)

3. Bitcoin's Price

Like gold or oil or any other asset, Bitcoins have a value that can be priced in USD or any other currency. This means there are people who are willing to exchange BTC with USD, usually using cryptocurrency exchanges, marketplaces which attract buyers and sellers. On exchanges we can see indications of supply and demand for cryptocurrencies at any price level (more on these later). We can also buy and sell Bitcoins with anyone in the world, physically on the streets or over the internet, or using brokers who mediate between buyers and sellers, or who trade on their own behalf. To trade BTC, we simply need the ability to send or receive BTC and the ability to receive or send the other asset, usually a local currency. (LEWIS, 2018, p. 214)

Like any other market-traded asset, the price of Bitcoin fluctuates with supply and demand. At any point in time, people trade at prices that they are comfortable buying or selling at. If there is more buying pressure and people want to buy more Bitcoins, prices will increase. If there is selling pressure and people want to sell more Bitcoins for fiat currencies, then the price at which the Bitcoins change hands will drop. Later we will go into more detail about how cryptocurrencies and tokens can be priced, but here we will look at specifically Bitcoin's price. (LEWIS, 2018, p. 215)

Bitcoin's price has been a wild ride. A recent price rise to almost \$69,000 USD per Bitcoin on 10-11-2021 and subsequent fall the \$32,791USD levels on 24-01-2022 has caught the

media’s attention and the price now at the current time that we making this presentation are in the \$42,439.96USD

These statistics are understandable better on the figure 2

Figure 2: bitcoin price from trading view.com



B. ETHEREUM

Ethereum is often described as “the world computer.” Ethereum is the community-run technology powering the cryptocurrency ether (ETH) and thousands of decentralized applications. (company, 2022)

1. Definition of Ethereum

Ethereum is the community-run technology powering the cryptocurrency ether (ETH) and thousands of decentralized applications. Ethereum is a technology that's home to digital money, global payments, and applications. The community has built a booming digital economy, bold new ways for creators to earn online, and so much more. It's open to everyone, wherever in the world With the mandatory the internet presence (company, 2022)

From a computer science perspective, Ethereum is a deterministic but practically unbounded state machine, consisting of a globally accessible singleton state and a virtual machine that applies changes to that state. From a more practical perspective, Ethereum is an open source, globally decentralized computing infrastructure that executes programs called smart contracts. It uses a blockchain to synchronize and store the system’s state changes, along with a crypto- currency called ether to meter and constrain execution resource costs. The Ethereum platform enables developers to build powerful decentralized applications with built-in economic functions. While providing high availability, audit ability, transparency, and neutrality, it also reduces or eliminates censorship and reduces certain counterparty risks. (Antonopoulos & Wood, 2018, p. 39)

2. The Birth of Ethereum

Toward the end of 2013, Vitalik Buterin, a young programmer and Bitcoin enthusiast, started thinking about further extending the capabilities of Bitcoin and Mastercoin (an overlay protocol that extended Bitcoin to offer rudimentary smart contracts). In October of that year, Vitalik proposed a more generalized approach to the Mastercoin team, one that allowed flexible and scriptable (but not Turing-complete) contracts to replace the specialized contract language of Mastercoin. While the Mastercoin teams were impressed, this proposal was too radical a change to fit into their development roadmap. In December 2013, Vitalik started sharing a whitepaper that outlined the idea behind Ethereum: Turing-complete, general-purpose blockchain. A few dozen people saw this early draft and offered feedback, helping Vitalik evolve the proposal. (Antonopoulos & Wood, 2018, p. 41)

Starting in December 2013, Vitalik and Gavin refined and evolved the idea, together building the protocol layer that became Ethereum. Ethereum's founders were thinking about a blockchain without a specific purpose that could support a broad variety of applications by being programmed. The idea was that by using a general-purpose blockchain like Ethereum, a developer could program their particular application without having to implement the underlying mechanisms of peer-to-peer networks, blockchains, consensus algorithms, etc. The Ethereum platform was designed to abstract these details and provide a deterministic and secure programming environment for decentralized blockchain applications. Much like Satoshi, Vitalik and Gavin didn't just invent a new technology; they combined new inventions with existing technologies in a novel way and delivered the prototype code to prove their ideas to the world. The founders worked for years, building and refining the vision. And on July 30, 2015, the first Ethereum block was mined. The world's computer started serving the world (Antonopoulos & Wood, 2018, p. 42)

3. learning Ethereum

Ethereum is a great platform for learning about blockchains and its building a massive community of developers, faster than any other blockchain platform. More than any other, Ethereum is a developer's blockchain, built by developers for developers. A developer familiar with JavaScript applications can drop into Ethereum and start producing working code very quickly. For the first few years of Ethereum's life, it was common to see T-shirts announcing that the creating of a token is just in five lines of code. Of course, this is a double-edged sword. It's easy to write code, but it's very hard to write good and secure code (Antonopoulos & Wood, 2018, p. 50)

Blockchains have a very steep learning curve, as they combine multiple disciplines into one domain: programming, information security, cryptography, economics, distributed systems, peer-to-peer networks, etc. Ethereum makes this learning curve a lot less steep, so anyone can get started quickly. But just below the surface of a deceptively simple environment lies a lot more. As the trader learns and starts looking deeper, there's always another layer of complexity and wonder. (Antonopoulos & Wood, 2018, p. 50)

C. comparison between Bitcoin and Ethereum

Many people will come to Ethereum with some prior experience of cryptocurrencies, specifically Bitcoin. Ethereum shares many common elements with other open blockchains: a peer-to-peer network connecting participants, a Byzantine fault-tolerant consensus algorithm for synchronization of state updates (a proof-of-work block-chain), the use of cryptographic primitives such as digital signatures and hashes, and a digital currency (ether). (Antonopoulos & Wood, 2018, p. 39/40)

Yet in many ways, both the purpose and construction of Ethereum are strikingly different from those of the open blockchains that preceded it, including Bitcoin.

Ethereum's purpose is not primarily to be a digital currency payment network. While the digital currency ether is both integral to and necessary for the operation of Ethereum, ether is intended as a utility currency to pay for use of the Ethereum platform as the world computer. Unlike Bitcoin, which has a very limited scripting language, Ethereum is designed to be a general-purpose programmable blockchain that runs a virtual machine capable of executing code of arbitrary and unbounded complexity. Where Bitcoin's Script language is, intentionally, constrained to simple true/false evaluation of spending conditions, Ethereum's language is Turing complete, meaning that Ethereum can straightforwardly function as a general-purpose computer. (Antonopoulos & Wood, 2018, p. 39/40)

Chapter 2

E-trading and the electronic platforms

According to (SMITH, 2021) , electronic trading seems easy from an investor's perspective through following some steps such as logging into the account, selecting the security the user wishes to buy or sell. Then, a click with the mouse or tapping the screen, and the transaction takes place. Instead, it is a complex process backed by an impressive array of technology. What was once associated with shouting traders and wild hand gestures has now become more closely associated with statisticians and computer programmers.

2-1- The electronic trading

The technological development in trading has many achievements and inventions that contribute to emerge innovative methods. In fact, trading methods now are more innovative and developed. Now, we are in the era of electronic trading as an outcome of the widespread of information and communication technology. In the following, some characteristics of electronic trading (SMITH, 2021)

This refers to a method of trading securities, financial derivatives or foreign exchange electronically. Both buyers and sellers use the internet to connect to a trading platform such as an exchange-based system or electronic communication network (ECN). (capital.com, 2019)

According to (SMITH, 2021) these are the most important keys for electronic trading:

- a) Electronic trading involves setting up an account with a brokerage of trader's choice, including providing his contact and financial information—to facilitate electronic transfers between the bank and the brokerage.
- b) When place an order, the complex technology enables the brokerage to interact with all the securities exchanges looking to execute trades, while those exchanges simultaneously interact with all the brokerages
- c) A computerized matching engine performs a high volume of trades each minute, and all work is backed up and accessible to be reviewed by investors, market makers and government regulators.
- d) All information is protected and stored by the Depository Trust Company, a record keeper of all financial transactions made by U.S. shareholders, therefore guaranteeing that no information is lost.

1. the appearance of electronic trading

The National Association of Securities Dealers, an association of over-the counter (OTC) market makers formed in 1939, created the first electronic stock market: the National Association of Securities Dealers Automated Quotations (NASDAQ) market. (wikipedia, 2021)

NASDAQ is a global electronic marketplace for buying and selling securities. Its name was originally an acronym for "National Association of Securities Dealers Automated Quotations"—NASDAQ started as a subsidiary of the National Association of Securities

Dealers (NASD), now known as the Financial Industry Regulatory Authority (FINRA). NASDAQ was launched after the Securities and Exchange Commission (SEC) urged NASD to automate the market for securities not listed on an exchange. The result was the first electronic trading system. NASDAQ opened for business on Feb. 8, 1971. (HAYES, Nasdaq definition, 2022)

i. NASDAQ PRICE EVOLUTION

The NASDAQ price evolution is understandable better on the next figure

Figure 3: NASDAQ price evolution from ctrader



In this chart we noticed that the NASDAQ price is on an uptrend since October 2022 till reaching the highest price that means it start rising from 2637.37 USD until it reaches 16800 USD by the ending of 2021. And currently the price is on a range.

2. Advantages and disadvantages of online trading

i. Advantages of online trading

According to (Campisi, 2016) there are a lot of advantages of online trading among them:

a. Lower fees

One of the clearest advantages of online trading is the reduction in transaction costs and high fees associated with traditional brick-and-mortar brokerage firms. Typically, the trader will pay between \$5 and \$10 to buy and sell stocks and exchange-traded funds at online discount brokerages, according to a Bloomberg report.

b. More control and flexibility

Time is often of the essence when trading stocks, so the speed of using online trading portals is a benefit to many investors. With online trading, the ability of executing the trade it's almost immediately. Traditional brick-and-mortar brokers might require appointments, either online, over the phone or in person, just to initiate a trade.

c. Ability to avoid brokerage bias

By taking trading into your own hands, you can eliminate brokerage bias. Bias sometimes occurs when a broker gives financial advice that benefits the broker — such as in the form of a commission for selling specific mutual funds and other products.

d. Access to online tools

In the world of online trading, a lower cost does not necessarily mean a shoddy product. Many of today's online trading companies offer customers an impressive suite of tools providing valuable information and helping optimize trades.

e. Option to monitor investments in real time

Many online trading sites offer stock quotes and trade information that make it easy for people to see how their investments are doing in real time.

ii. Disadvantages of online trading

(Campisi, 2016) Also mentioned a disadvantages among them

a. Easier to invest too much too fast

Because online trading is so easy —basically by pushing a button — there is the risk of making poor investment choices or overinvesting.

Online investors can protect themselves by understanding the stocks they are buying and setting up safeguards in fast-paced markets. Placing a limit order on the account is one way to control what the trader buy and how much of it.

b. No personal relationships with brokers

From getting help on how to create an investment strategy to understanding how the results of feedback mechanisms affect the market, online traders are left to their own devices. For some, this kind of autonomy can be unsettling.

Experts often stress the importance of research, particularly for new traders. You need to learn as much as you can about the companies in which you invest.

c. Addictive nature

Online traders can experience a certain high when trading that is similar to what people experience when gambling, according to a recent study on excessive trading published in the journal *Addictive Behaviors*. The study noted that some investors choose short-term trading strategies that involve investing in risky stocks offering the potential for large gains but also significant losses. “The structure itself of the two activities (gambling and trading) is very close,” the study concluded.

d. Internet-dependent

The nature of online trading means that, ultimately, the trader is under the mercy of his own internet connection. If the internet connection is too slow or is interrupted, he can lose out on a potentially important or lucrative trade.

e. **Buying errors due to computer missteps**

With online trading, to simply assume a trade was not completed can cost the money. Investors who believe their trade was not completed might make the trade again and end up investing twice as much as they intended. Assuming a trade was completed without seeing confirmation of the fact also is a mistake. Make sure the understanding of how to verify trades and review statements before using an online investing system.

3. trader and investor profiles

There is a big difference between investing and trading, and the first thing to determine is the profile anyone wants to have: that of an investor or a trader?

I. The investor profile

An investor is generally focused on the long term and therefore not concerned by short-term price movements. What is long-term investment? This type of investment consists in buying one or more crypto-currencies for a defined amount of money and then letting the digital assets sleep and reselling those several weeks, months, years later in order to make a profit. It is the principle of "HODL", a well-known term in the market that defines the strategy of never reselling because it is assumed that the market will always rise. Building a "long-term" wallet is very important and the choice of cryptocurrencies should not be made at random. It must be the result of in-depth market analysis and study. By following the advice of the experts, the investor will be guided through this process and will be able to invest in a serene way and put all the chances on his side. (Marcus, 2018)

II. The trader's profile

The second possibility is to adopt a trader's profile. The consists, Trading in the cryptocurrency market requires good knowledge in technical analysis and rigour. Day trading consists of studying market curves in order to enter and exit the market at the highest point of the wave, just before confirming a downward movement. The best way is to divide the wallet into several categories that include these two types of investments. (Marcus, 2018)

2- 2- The electronic platforms

A trading platform is software used for trading: opening, closing, and managing market positions through a financial intermediary such as an online broker. Online trading platforms are frequently offered by brokers either for free or at a discount rate in exchange for maintaining a funded account and/or making a specified number of trades per month. (CHEN, 2021)

1. Basics of Trading Platform

According to (WIKIPEDIA, 2022) an electronic trading platform is a piece of computer software that allows users to place orders for financial products over a network with a financial intermediary. These products include products such as stocks, bonds, currencies, commodities, and derivatives. The first widespread electronic trading platform was NASDAQ. The availability of such trading platforms to the public has encouraged a surge in retail investing.

i. Picking a Platform

When deciding between trading platforms, traders and investors should consider both the fees involved and features available. Day traders and other short-term traders may require features like Level 2 quotes and market maker depth charts to assist in decision-making, while options traders may need tools that are specifically designed to visualize options strategies. (CHEN, 2021)

Fees are another important consideration while choosing trading platforms. In general, lower fees are always preferable but there may be trade-offs to consider. Some trading platforms may be agnostic to a specific intermediary or broker, while other trading platforms are only available when working with a particular intermediary or broker. As a result, investors should also consider the reputation of the intermediary or broker before committing to a specific trading platform to execute trades and manage their accounts. And finally, trading platforms may have specific requirements to qualify for their use.(CHEN, 2021)

ii. The digital wallet

A digital wallet (or electronic wallet) is a financial transaction application that runs on mobile devices and computers. It securely stores the payment information and passwords. These applications allow the trader to pay when he is shopping using his device so that the trader doesn't need to carry his own cards around. He enters and stores his credit card, debit card, or bank account information and can then use his own device to pay for purchases.(KAGAN, 2022)

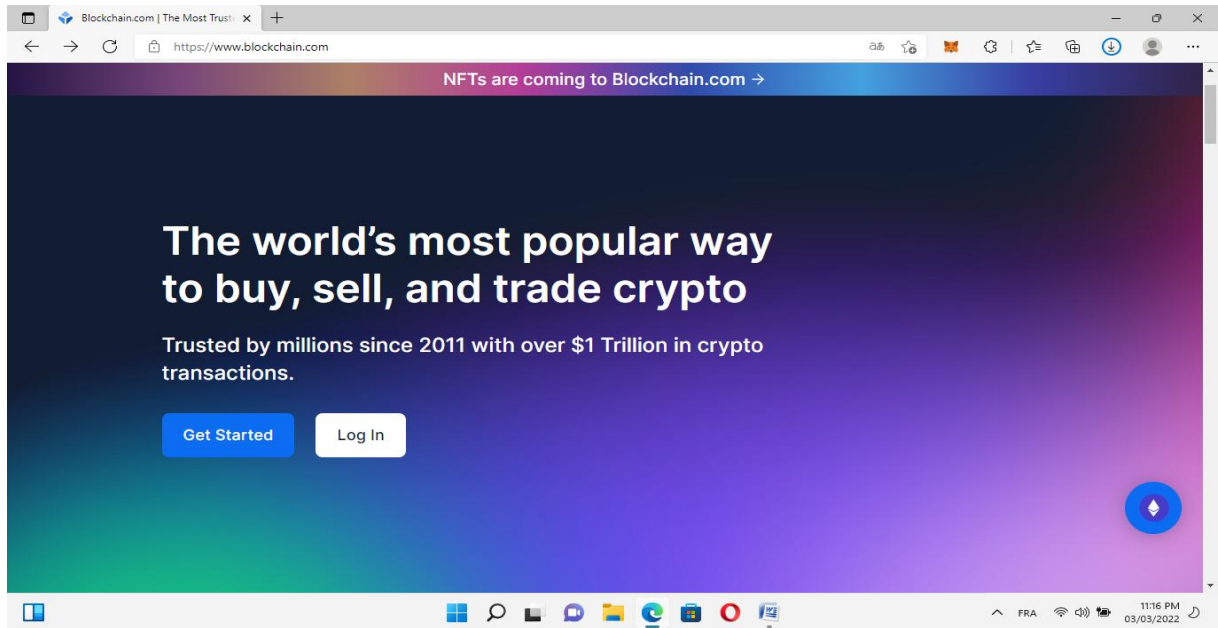
Digital wallets are financial accounts that allow users to store funds, make transactions, and track payment histories by computer. These pieces of software may be included in a bank's mobile app, or as a payments platform like PayPal or Alipay. Digital wallets are also the main interface for using cryptocurrencies such as Bitcoin. (KAGAN, 2022)

2. creating a blockchain wallet

To create a blockchain wallet, we should follow the main following steps:

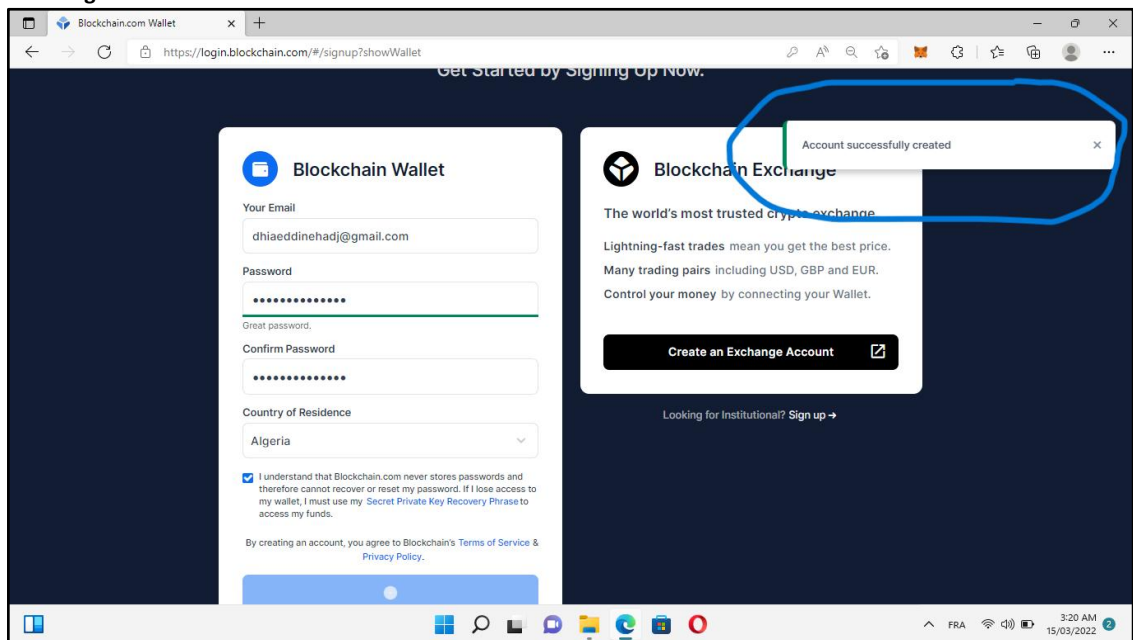
Step1: Opening the official blockchain website <https://www.blockchain.com> on the browser then clicking at the get started bottom.

Figure 4: The official blockchain's website <https://www.blockchain.com>



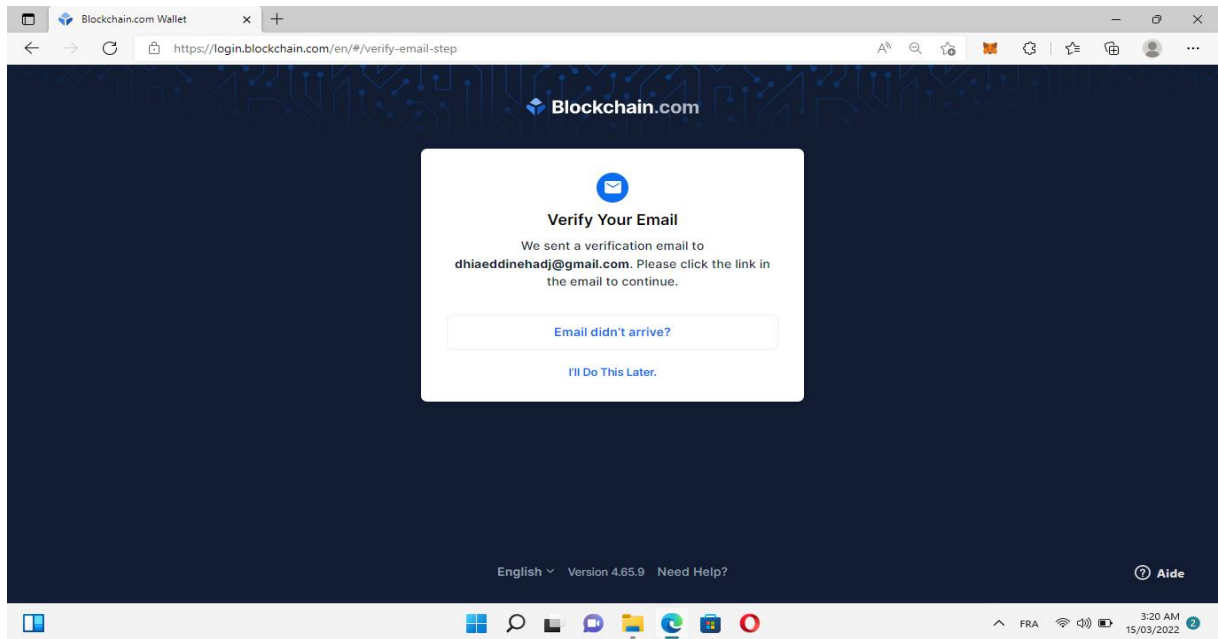
Step 2: after you click get started, enter your personal information then press “create wallet”, when you done filling your personal information correctly it appear a tiny notification on the left high corner “account successfully created”

Figure 5: blockchain wallet from blockchain.com



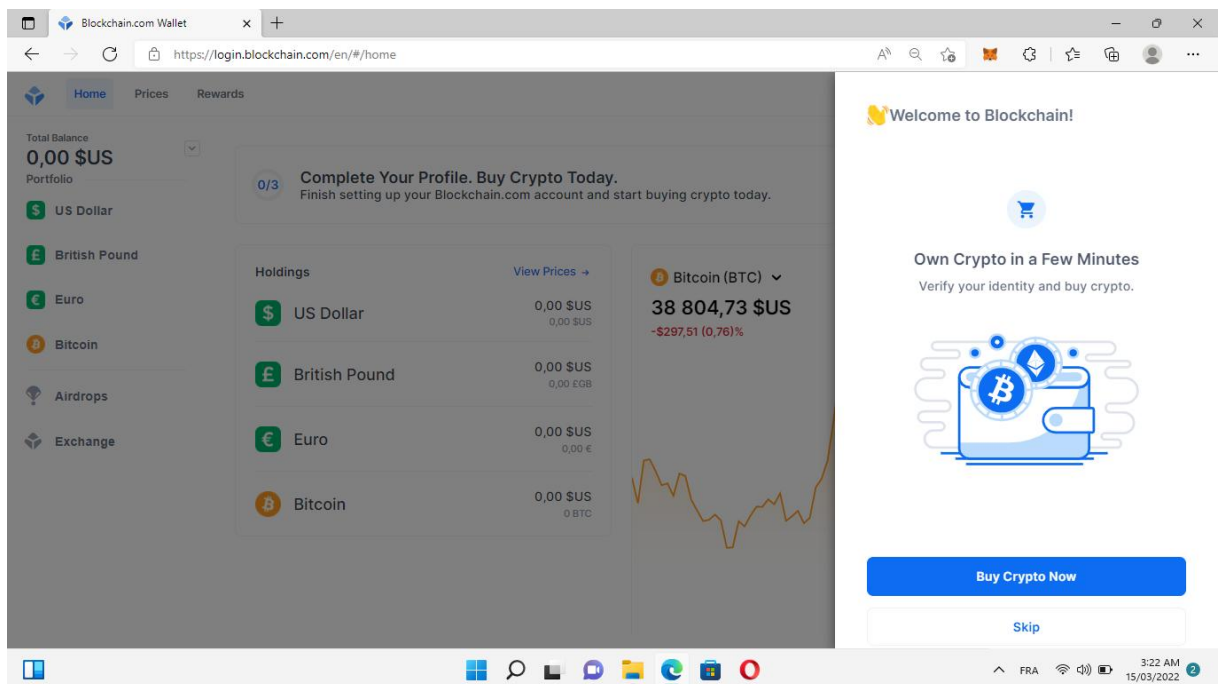
Step 3: after the procedures of the second step it appears a new tool window that propose to you to confirm your email address

Figure 6: verification email icon from blockchain.com



Finally after confirming your email address your account is ready and secure

Figure 7: the appearance of the blockchain wallet from blockchain.com



3. Most common platforms for exchanging crypto

If anyone wants to buy or sell cryptocurrencies, opening an account with a cryptocurrency exchange is a great way to start. Crypto exchanges function similarly to online brokerage platforms, providing the tools for buying and selling digital currencies and tokens like Bitcoin, Ethereum, and Dogecoin. (LIELACHER, 2022)

When choosing a cryptocurrency exchange, it's important to look at factors such as supported assets, fees, payment methods, and security. to help for finding the right platform for exchanges. (LIELACHER, 2022)

a) The Most popular platforms on 2022

According to (10 Best Crypto Exchanges & Platforms of May 2022, 2022) these are the 10 best platforms for exchanging crypto.

1. Coinbase

Coinbase is by far the most popular and one of the best cryptocurrency exchanges because you can invest directly with USD. You can currently purchase Bitcoin, Ethereum, and Litecoin and 30+ other coins and tokens on the platform. Furthermore, you can earn interest on your USDT, and you can earn token rewards by completing various activities

2. Voyager

Voyager is a popular platform to invest in crypto as it was one of the first publicly traded exchanges. They are app-driven and offer a commission-free trading structure.

.Voyager supports most major cryptocurrencies, has solid support and engagement, and pays competitive interest rates on assets.

Plus, when you open a Voyager account, you can earn \$25 in BTC after trading \$100 in crypto.

3. BlockFi

BlockFi is a cryptocurrency investment platform that allows you to lend and earn interest on your holdings.

Also, instead of selling your coins and tokens, you can also borrow against your holdings. If you're just looking to hold your tokens; you can also just let them earn interest for you.

Bonus Offer: Get up to \$250 bonus when you make a \$25 deposit and maintain it for the specified period of time.

4. Uphold

Uphold offers simple solution to trading multiple assets — open one account and trade multiple assets without making a trip back to cash. If you've every traded crypto, you'll know a lot of coins and tokens only trade in certain pairs, so you're always going back to BTC or ETH. But on Uphold, you can trade multiple assets directly.

5. Kraken

Kraken is one of the original crypto trading platforms and they have a good selection of coins and tokens to trade and invest in. They also allow margin trading. However, it's a real exchange, and not as easy to use as some of the top platforms on this list. Kraken is one of the few platforms on this list that allow you to trade in DOGE and other, more risky, tokens.

Note: Kraken offers a limited section of coins and tokens to US customers versus international customers

6. Etoro

eToro has been around for a while in the UK and throughout Europe, but they are now allowing traders in the United States. They offer a huge variety of digital assets to buy and sell on their platform, and even better, they have a practice trading account so you can give it a try before you actually use real funds. Right now, eToro is also offering a \$10 bonus if you deposit and trade \$100 in crypto-assets. This offer is only available for US users.

7. Bitcoin IRA

Bitcoin IRA is a little different than the other platforms here. Unlike most exchanges and wallets, you're basically just exchanging currency and are subject to paying taxes on your gains (learn how taxes on your cryptocurrencies work here).

With that being said, Bitcoin IRA combines the best of being a crypto wallet and exchange, with also being an IRA. That means that your gains inside the account are tax free or tax deferred.

8. Crypto.com

Crypto.com is one of the largest and fastest growing crypto exchanges. It's based in Hong Kong, but offers a ton of support for US-based customers.

Right now, you can have access to over 90 tokens and coins worldwide, and 50 tokens and coins if you're in the United States. Plus, the offer solid rates on their crypto savings accounts. The only major drawback is that it's only app-based at this time, there is no desktop platform

9. Binance

Binance is a great platform for getting into some currencies like Cardano or Neo. Not as easy to use as some of the top platforms on this list, but they do have one of the most robust trading platforms out there. They do have a decent mobile app, but again, not as easy to use and we've been frustrated with it.

Note: Binance.us is the US-version of the platform and has limited coins and tokens to invest in versus the international version of Binance.

10. Hodlnaut

If you're looking for an alternative to trading cryptocurrencies, check out Hodlnaut. Hodlnaut is a savings and lending platform that focuses on Bitcoin and several stable coins.

Right now, you can earn up to 7.46% on your bitcoin and up to 12.73% on your USDC through saving and lending options on their platform.

b) Advantages and disadvantages of these platforms (pros and cons)

The next table contains the pros and the cons of the previous platforms

Table 2: Advantages and disadvantages of these platforms (10 Best Crypto Exchanges & Platforms of May 2022, 2022)

The Platform	The pros	The Cons
Coinbase	<ul style="list-style-type: none"> • -Easiest to use interface • Good selection of tokens and coins to invest in • High level of security and 	<ul style="list-style-type: none"> • High fees unless using Coinbase Pro • User does not control private keys in wallet

	trustworthiness	<ul style="list-style-type: none"> • Slow to adopt popular new cryptocurrencies
voyager	<ul style="list-style-type: none"> • Very easy to use app-based interface • Commission-free trading structure • Voyager provides solid interest rates 	<ul style="list-style-type: none"> • Slow withdrawals (can take upwards of 1 day) • Not available in New York (yet)
BlockFi	<ul style="list-style-type: none"> • No commissions and fees • US-Based and regulated • Earn high interest on deposits 	<ul style="list-style-type: none"> • Doesn't support many tokens and coins • Limited free withdrawals
Uphold	<ul style="list-style-type: none"> • Simple and transparent pricing structure • Lots of crypto tokens and even some stocks, including popular ones like XRP • Both desktop and mobile apps 	<ul style="list-style-type: none"> • Not as easy to use as some on this list • Some reports of poor customer service
Karken	<ul style="list-style-type: none"> • One of the longest running crypto exchanges • High level of security and trust • Large variety of crypto and tokens to trade 	<ul style="list-style-type: none"> • One of the more difficult platforms to use • Difficulty with 2FA • Some reports of poor customer service
Etoro	<ul style="list-style-type: none"> • Worldwide options for trading crypto • Ability to copy other traders portfolios • Low minimums to star 	<ul style="list-style-type: none"> • Limited options in the United States • Only available in 41 states • Doesn't support as many tokens and coins as other platforms on this list
Bitcoin IRA	<ul style="list-style-type: none"> • Invest in cryptocurrency inside your IRA • Ability to earn interest on your crypto inside your IRA • High Security options 	<ul style="list-style-type: none"> • High fees • High minimums • Doesn't support as many tokens and coins as other platforms on this list
Crypto.com	<ul style="list-style-type: none"> • Huge amount of supported coins and tokens • Pays weekly interest on crypto savings • You can get a debit card linked to your account 	<ul style="list-style-type: none"> • Complicated fee structure • No desktop support, only app-based • Limited customer support
Binance	<ul style="list-style-type: none"> • Huge amount of supported coins and tokens • Fast transactions times <ul style="list-style-type: none"> • Low fees 	<ul style="list-style-type: none"> • U.S. has limited options compared to worldwide • Not available in USA • Limited customer support

Hodlnaut	<ul style="list-style-type: none"> • Pays high interest on holdings <ul style="list-style-type: none"> • No minimum balance requirements • Get \$20 free when you deposit \$1000 	<ul style="list-style-type: none"> • Only supports BTC,USDT,ETH, USDC,DAI • Support is based in Singapore and may be slow to respond
----------	--	--

Chapter 3: Important steps to Trade with crypto currencies (The Analysis)

3-1: Fundamental analysis

Fundamental analysis (F.A.) is essential and consists in collecting information related to the crypto currency or project in which having the objective to invest. Many sites are specialized and the trader could find predominant information that can influence his choices. The advice is always given to everyone to do his own research ("DYOR": Do Your Own Research). But carefully: many newcomers in the crypto world will tend to believe absolutely everything that can be said on blogs and forums. Unfortunately, while much information may be correct, much can also be false, even commercial advertisements and/or scams. The recommendation is the checking of the information found several times. (Marcus, 2018)

There 2 important elements everyone must know after the market cap to make his own fundamental analysis is “**the white paper and the road map**” this 2 elements we will find them on the official coin website which we will discuss.

➤ **The coin website**

The coin website is the official website for a specific coin that there anyone will find the information about the coin either the market cap or the white paper or the road map.

1. The white paper

White Paper is an informational document issued by the company describing the features of the product and the solutions it can offer

According to (Deshpande, 2022) the whitepaper is a document released by developers that explains the technology and purpose of the project they are working on. It tells prospective investors how the cryptocurrency was conceived and highlights its purpose. A crypto whitepaper contains various forms of data like statistics, diagrams, and formulas. The goal of this data is to convince prospective investors to invest in that cryptocurrency.

Reading a whitepaper may be the best way to understand a crypto project you are interested in. But many people are confused about how to go about it, as whitepapers do not make for light reading, especially if we aren't very tech-savvy. The good news is we do not need to have a background in computer science to understand a whitepaper. (Deshpande, 2022)

The Bitcoin White Paper was published by Satoshi Nakamoto on metzdowd.com's Cryptography Mailing List on October 31, 2008.

2. The road map

According to (Ma, 2022) the Roadmap is a business planning technique which lays out the short and long term goals of a particular project within a flexible estimated timeline. For an emerging product or a startup, the roadmap should articulate the goals and vision of the project, while laying out the development milestones with a rough time estimate for achieving these milestones.

Internally, the roadmap is used as a strategic vision for focusing the development team and providing clear goals and milestones for shipping a completed product. It also gives a sense of priority to specific tasks based upon the intended structure of the finished product. For investors, the roadmap provides insight into the direction and vision for the project, while also serving as a measure for the pace and success of the evolving product. Often the roadmap is presented in a simplified form as a flow diagram with development goals in boxes with rough completion times, indicating the various stages of significant development and significant product milestones. (Ma, 2022)

3-2: Technical analysis

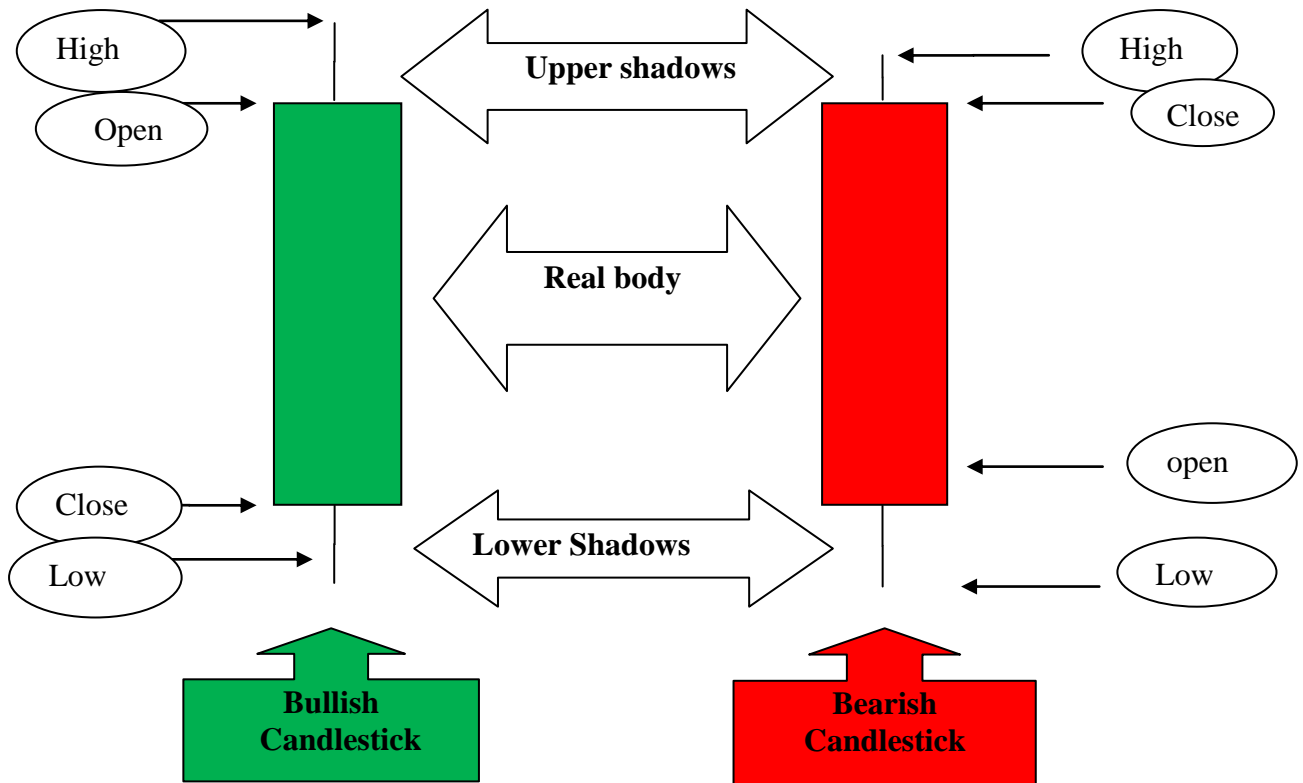
Technical analysis is a tool which studies the price curve in a very different way. Indeed, technical analysis (TA) is the forecasting of future price movements by analyzing past market data, mainly prices and volume. (Marcus, 2018). In the following, we give a comprehensive explanation about the technical analysis tools:

1. Japanese candlestick

A Japanese candlestick is a type of price chart that shows the opening, closing, high and low price points for each given period. It was invented by Japanese rice merchants centuries ago, and popularized among Western traders by a broker called Steve Nison in the 1990s. (Foot, 2019)

a- Japanese candlestick bars

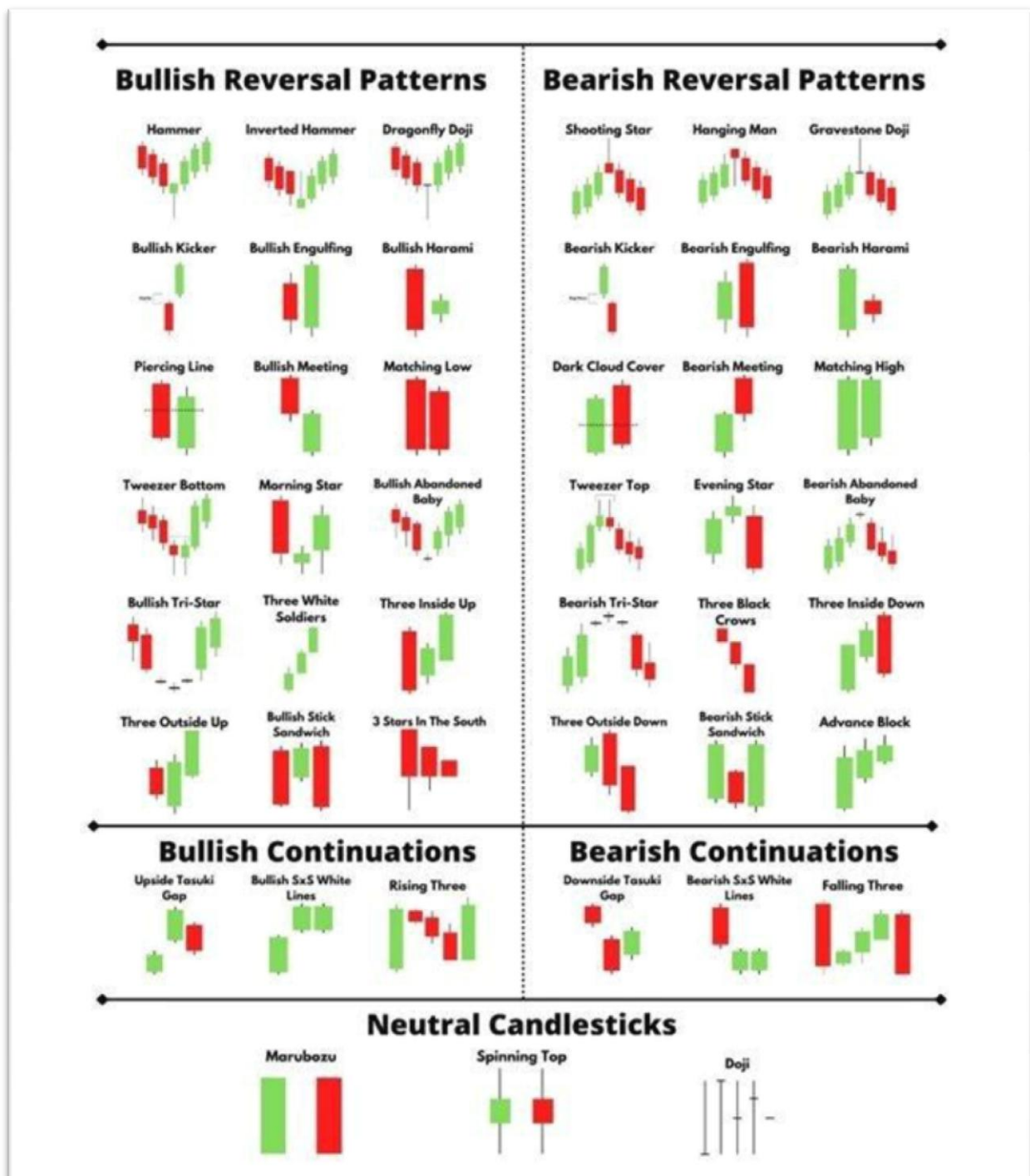
Figure 8: Japanese candlestick bars from (nison, 2001, p. 25)



b- Japanese candles types

This figure shows the types of Japanese candlestick pattern.

Figure 9 Japanese Candlestick Patterns (Iamo, 2021)



2. Basics of technical analysis

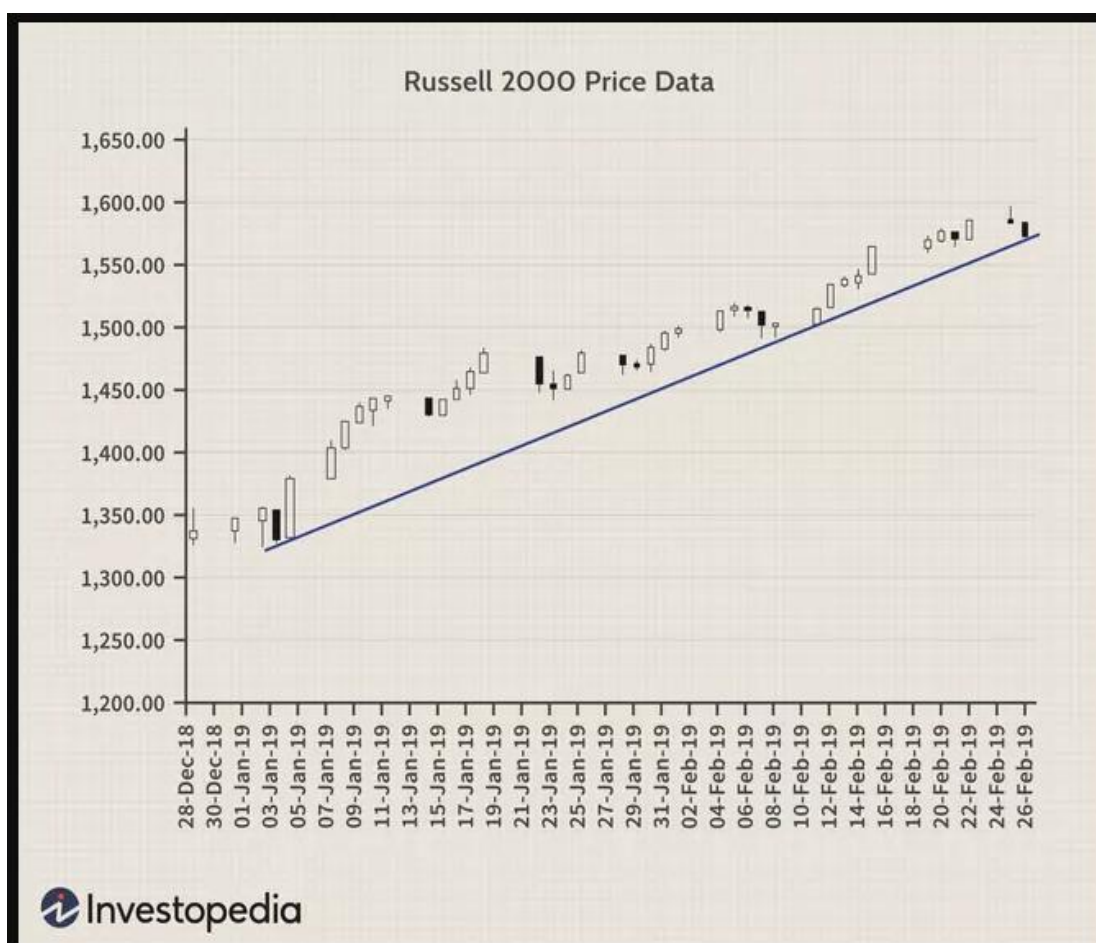
a) Trend line

Trendlines are easily recognizable lines that traders draw on charts to connect a series of prices together or show some data's best fit. The resulting line is then used to give the trader a good idea of the direction in which an investment's value might move.(CHEN, trendline, 2021)

A trendline is a line drawn over pivot highs or under pivot lows to show the prevailing direction of price. Trendlines are a visual representation of support and resistance in any time frame. They show direction and speed of price, and also describe patterns during periods of price contraction.(CHEN, trendline, 2021)

Below is data for the Russell 2000 in a candlestick chart with the trendline applied to three session lows over a two month period.

Figure 10 Russell price data (CHEN, Trading Platform, 2021)

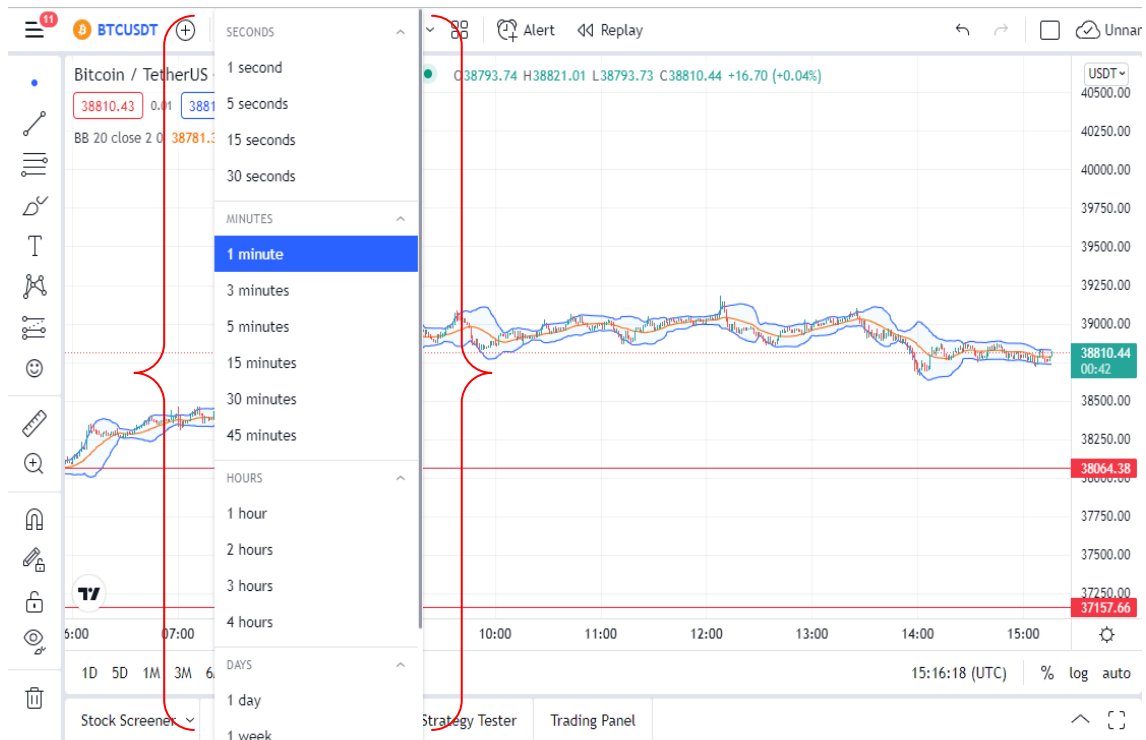


b) Time frames

A time frame refers to the amount of time that a trend lasts for in a market, which can be identified and used by traders. Primary or immediate time frames are actionable right now and are of interest to day-traders and high-frequency trading. Other time frames, however, should also be on the radar that can confirm or refute a pattern, or indicate simultaneous or contradictory trends that are taking place. These time frames can range from minutes or hours to days or weeks, or even longer. (FUNDORA, 2022)

This figure shows the time frame in tradingview platform:

Figure 11 the time frame in tradingview.com



c) The Spread

A spread can have several meanings in finance. Generally, the spread refers to the difference between two prices, rates, or yields. In one of the most common definitions, the spread is the gap between the bid and the ask prices of a security or asset, like a stock, bond, or commodity. This is known as a bid-ask spread.(SEGAL, 2022)

Spread can also refer to the difference in a trading position – the gap between a short position (that is, selling) in one futures contract or currency and a long position (that is, buying) in another. This is officially known as a spread trade. (SEGAL, 2022)

This figure shows the spread in BTCUSDT market in tradingview:

Figure 12: the spread in BTCUSDT market in tradingview.com

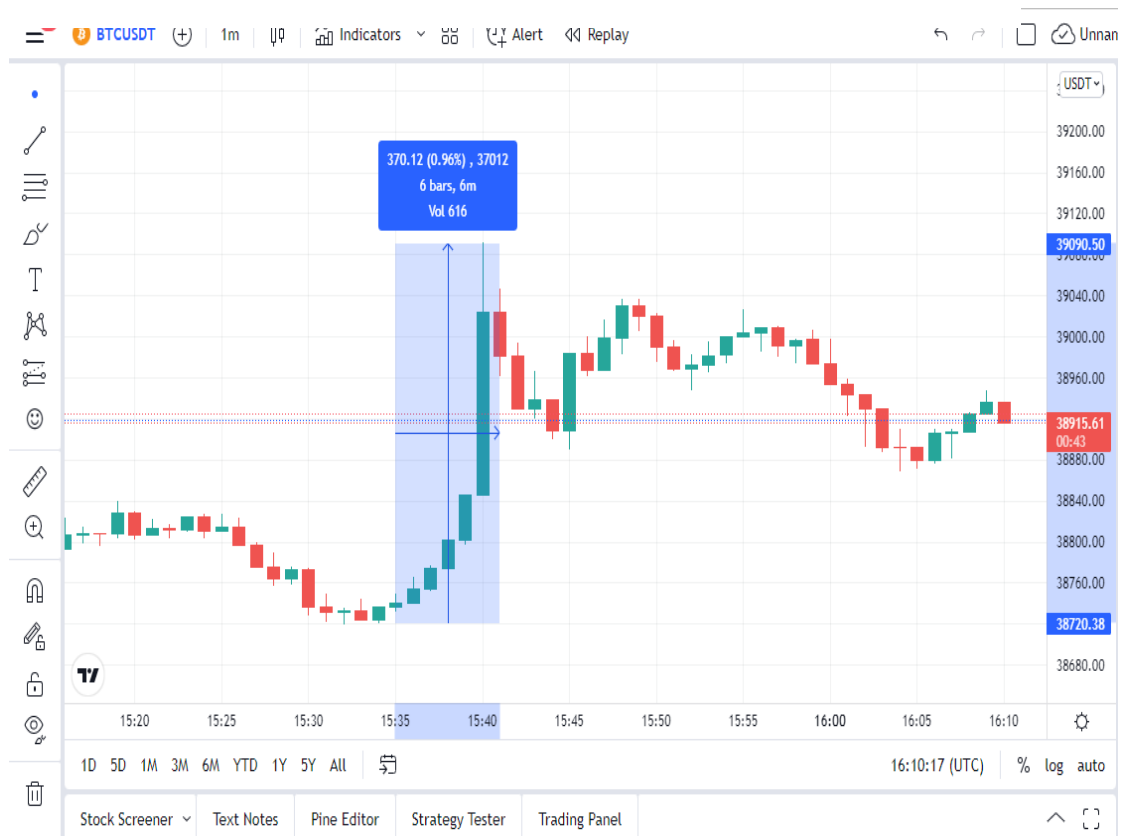


d) The Bips

Basis points, otherwise known as bps or "bips," are a unit of measure used in finance to describe the percentage change in the value or rate of a financial instrument. One basis point is equivalent to 0.01% (1/100th of a percent) or 0.0001 in decimal form. In the bond market, a basis point is used to refer to the yield that a bond pays to the investor.(LANGAGER, 2021)

This figure shows the bips in BTCUSDT market in tradingview.com

Figure 13 the bips in BTCUSDT market in tradingview.com



e) The Range

A trading range occurs when a security trades between consistent high and low prices for a period of time. The top of a security's trading range often provides price resistance, while the bottom of the trading range typically offers price support. Trading range refers to the difference between the high and low prices in a given trading period.(HAYES, 2021)Range-bound trading is characterized by prices staying in a definable range over time. A trading range is characterized by both a support price and a resistance price, between which the price tends to fluctuate.(HAYES, 2021)

Figure 14: example of trading range (HAYES, Trading range, 2021)

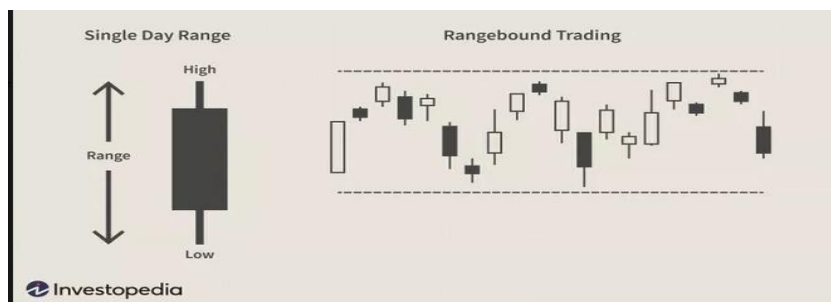


Figure 15 example of trading range (HAYES, Trading range, 2021)



3. Support and Resistance

Support and resistance levels are like the ends of an Olympic swimming pool. Just as the ends of the pool tell swimmers when it is time to turn around and start swimming in the opposite direction, support and resistance levels tell if the price of the currency is likely to stop, to turn around, and to start moving in the opposite direction in the future. Knowing where the currency may stop and turn around helps to enter and exit the investments at the most profitable times. (tradementor, 2008)

Support is a price level at which a currency pair tends to stop moving down, then turns around and starts climbing.

Resistance is a price level at which a currency pair tends to stop moving up, then turns around and starts falling.

-Support levels illustrate important psychological levels in the currency market. Support levels usually form because of the following:

- Traders who missed an earlier buying opportunity decide it is a good time to get into the trade
- Traders who bought the currency decide it is a good time to add to their positions
- Traders who sold the currency decide it is a good time to take profits

- Resistance levels illustrate important psychological levels in the market. Resistance levels form because of the following:

- Traders who missed an earlier selling opportunity decide it is a good time to get into the trade
- Traders who sold the currency decide it is a good time to add to their positions
- Traders who bought the currency decide it is a good time to take profits

Support and resistance levels are not precise. Instead they are general price ranges. When anyone is identifying his support and resistance levels, he had to picture himself drawing them in with a large marker instead of a fine tipped pen.(tradementor, 2008)

Important: the old support is a new resistance, and the old resistance is a new support

The next figure shows the support and resistance lines in the ETH/TETH market.

Figure 16: the support and resistance lines in eth/teth market from tradingview.com



4. Trading indicators

Technical indicators come from each of the four broad indicator categories, trend, momentum, volatility and volume, and they are used to create technical analysis of the FX market.

Technical indicators use mathematical formulas to make speedy calculations and then plot the results on a handy graph. (Anastasiou, 2021)

By using these technical indicators, such as the moving average convergence divergence indicator, the relative strength index or the Bollinger Bands, traders can avoid having to carry out time-consuming, complex mathematical calculations. Furthermore, traders won't need to plot their results or convert formulaic results into digestible forms of data to finalize their trades (Anastasiou, 2021)

a. Moving Average Convergence Divergence (MACD)

Moving average convergence divergence (MACD) is a trend-following momentum indicator that shows the relationship between two moving averages of a security's price. The MACD is calculated by subtracting the 26-period exponential moving average (EMA) from the 12-period EMA. The result of that calculation is the MACD line. A nine-day EMA of the MACD called the "signal line," is then plotted on top of the MACD line, which can function as a trigger for buy and sell signals. Traders may buy the security when the MACD crosses above its signal line and sell—or short—the security when the MACD crosses below the signal line. Moving average convergence divergence (MACD) indicators can be interpreted in several ways, but the more common methods are crossovers, divergences, and rapid rises/falls (FERNANDO, 2022)

While the moving average convergence divergence is composed of two lines, it is really a combination of three exponentially smoothed moving averages. The first line is the difference between two exponential moving averages. The second line of the MACD is made by taking exponential moving averages (usually 9-period) of the difference between the two exponential moving averages used to make the first line. This second line is called the signal line (nison, 2001, p. 237)

Figure 17: trading tools indicators – MACD (FERNANDO, 2022)



The red circles are the signals of the entry price

MACD Formula

MACD=12-Period EMA – 26-Period EMA

MACD is calculated by subtracting the long-term EMA (26 periods) from the short-term EMA (12 periods). An exponential moving average (EMA) is a type of moving average (MA) that places a greater weight and significance on the most recent data points. The exponential moving average is also referred to as the exponentially weighted moving average. An exponentially weighted moving average reacts more significantly to recent price changes than a simple moving average (SMA), which applies an equal weight to all observations in the period.(FERNANDO, 2022)

Learning from MACD

The MACD has a positive value (shown as the blue line in the lower chart) whenever the 12-period EMA (indicated by the red line on the price chart) is above the 26-period EMA (the blue line in the price chart) and a negative value when the 12-period EMA is below the 26-period EMA. The more distant the MACD is above or below its baseline indicates that the distance between the two EMAs is growing. (FERNANDO, 2022)

The next chart shows how the two EMAs applied to the price chart correspond to the MACD (blue) crossing above or below its baseline (dashed) in the indicator below the price chart.

Figure 18: trading tools indicators – MACD (FERNANDO, 2022)



b. Bollinger Band

A Bollinger Band is a technical analysis tool defined by a set of trendlines plotted two standard deviations (positively and negatively) away from a simple moving average (SMA) of a security's price, but which can be adjusted to user preferences. It also and copyrighted by famous technical trader John Bollinger, designed to discover opportunities that give investors a higher probability of properly identifying when an asset is oversold or overbought.(HAYES, Bollinger Band®, 2021)

The first step in calculating Bollinger Bands is to compute the simple moving average of the security in question, typically using a 20-day SMA. A 20-day moving average would average out the closing prices for the first 20 days as the first data point. The next data point would drop the earliest price, add the price on day 21 and take the average, and so on. Next, the standard deviation of the security's price will be obtained. Standard deviation is a mathematical measurement of average variance and features prominently in statistics, economics, accounting, and finance. (HAYES, Bollinger Band®, 2021)

Bollinger Bands are a highly popular technique. Many traders believe the closer the prices move to the upper band, the more overbought the market, and the closer the prices move to the lower band, the more oversold the market. John Bollinger has a set of 22 rules to follow when using the bands as a trading system (HAYES, Bollinger Band®, 2021)

i. The Squeeze

The squeeze is the central concept of Bollinger Bands. When the bands come close together, constricting the moving average, it is called a squeeze. A squeeze signals a period of low volatility and is considered by traders to be a potential sign of future increased volatility and possible trading opportunities. Conversely, the wider apart the bands move, the more likely the chance of a decrease in volatility and the greater the possibility of exiting a trade. However, these conditions are not trading signals. The bands give no indication when the change may take place or in which direction the price could move. (HAYES, Bollinger Band®, 2021)

ii. Breakouts

Approximately 90% of price action occurs between the two bands. Any breakout above or below the bands is a major event. The breakout is not a trading signal. The mistake most people make believes that that price hitting or exceeding one of the bands is a signal to buy or sell. Breakouts provide no clue as to the direction and extent of future price movement. (HAYES, Bollinger Band®, 2021)

The next figure shows Bollinger band indicator from tradingview.com

1. Bollinger band

Figure 19: Bollinger band indicator from tradingview.com



i. Squeeze

Figure 20: Bollinger band indicator (squeeze) from tradingview.com



ii. Breakout

Figure 21: Bollinger band indicator (breakout) from tradingview.com



2. Stochastic Oscillator

A stochastic oscillator is a momentum indicator comparing a particular closing price of a security to a range of its prices over a certain period of time. The sensitivity of the oscillator to market movements is reducible by adjusting that time period or by taking a moving

average of the result. It is used to generate overbought and oversold trading signals, utilizing a 0–100 bounded range of values.(HAYES, Stochastic Oscillator, 2021)

The stochastic oscillator is another popular tool. It like all the other oscillators provides overbought and oversold readings and signals divergences. It also affords a mechanism to relate a shorter-term trend to a longer-term trend. The stochastic indicator compares the latest closing price with the total range of price for a specific period. Stochastic values are between 0 and 100. A high stochastic reading would mean the close is near the upper end of the entry range for the period. A low reading means that the close is near the low end of the period's range. The idea behind stochastic is that as the market moves higher, closes tend to be near the highs of the range; as the market moves lower, the prices tend to cluster near the lows of the range. (nison, 2001, p. 233)

i. The Formula for the Stochastic Oscillator Is

$$\%K = \left(\frac{C - L14}{H14 - L14} \right) \times 100$$

Where:

C = the most recent closing price

L14 = the lowest price traded of the 14 previous trading sessions

H14 = the highest price traded during the same 14-day period

%K = the current value of the stochastic indicator

Notably, %K is referred to sometimes as the fast stochastic indicator. The "slow" stochastic indicator is taken as %D = 3-period moving average of %K. (nison, 2001, p. 234)

i. The Stochastic Oscillator Tells

The stochastic oscillator is range-bound, meaning it is always between 0 and 100. This makes it a useful indicator of overbought and oversold conditions. Traditionally, readings over 80 are considered in the overbought range, and readings fewer than 20 are considered oversold. However, these are not always indicative of impending reversal; very strong trends can maintain overbought or oversold conditions for an extended period. Instead, traders should look to changes in the stochastic oscillator for clues about future trend shifts.(HAYES, Stochastic Oscillator, 2021)

Stochastic oscillator charting generally consists of two lines: one reflecting the actual value of the oscillator for each session and one reflect its three-day simple moving average. Because price is thought to follow momentum, the intersection of these two lines is considered to be a signal that a reversal may be in the works, as it indicates a large shift in momentum from day to day. (HAYES, Stochastic Oscillator, 2021)

Divergence between the stochastic oscillator and trending price action is also seen as an important reversal signal. For example, when a bearish trend reaches a new lower low, but the oscillator prints a higher low, it may be an indicator that bears are exhausting their momentum and a bullish reversal is brewing.(HAYES, Stochastic Oscillator, 2021)

Figure 22: stochastic oscillator (HAYES, Stochastic Oscillator, 2021)



Triangles

A triangle is a chart pattern, depicted by drawing trendlines along a converging price range that connotes a pause in the prevailing trend. Technical analysts categorize triangles as continuation patterns.(CHEN, Triangle, 2021)

In technical analysis, a triangle is a continuation pattern on a chart that forms a triangle-like shape. Triangles are similar to wedges and pennants and can be either a continuation pattern, if validated, or a powerful reversal pattern, in the event of failure. There are three potential triangle variations that can develop as price action carves out a holding pattern, namely ascending, descending, and symmetrical triangles.(CHEN, Triangle, 2021)

Understanding Triangle Patterns

Triangle patterns are aptly named because the upper and lower trendlines ultimately meet at the apex on the right side, forming a corner. Connecting the start of the upper trendline to the beginning of the lower trendline completes the other two corners to create the triangle. The upper trendline is formed by connecting the highs, while the lower trendline is formed by connecting the lows.

Triangles are similar to wedges and pennants and can be either a continuation pattern, if validated, or a powerful reversal pattern, in the event of failure. There are three potential triangle variations that can develop as price action carves out a holding pattern, namely ascending, descending, and symmetrical triangles. Technicians see a breakout, or a failure, of a triangular pattern, especially on heavy volume, as being potent bullish/bearish signals of a resumption, or reversal, of the prior trend.(CHEN, Triangle, 2021)

Type of Triangles

Ascending Triangle

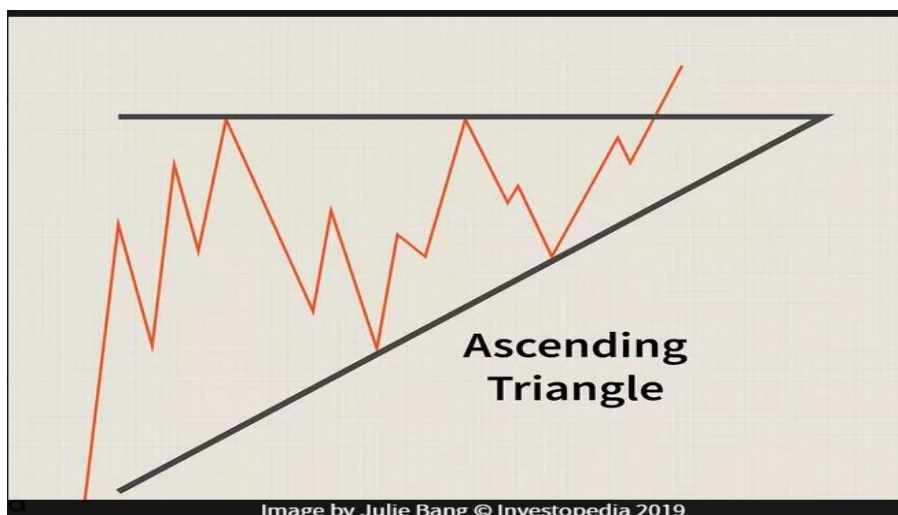
An ascending triangle is a breakout pattern that forms when the price breaches the upper horizontal trendline with rising volume. It is a bullish formation. The upper trendline must be horizontal, indicating nearly identical highs, which form a resistance level. The lower trendline is rising diagonally, indicating higher lows as buyers patiently step up their bids. Eventually, the buyers lose patience and rush into the security above the resistance price, which triggers more buying as the uptrend resumes. The upper trendline, which was formerly a resistance level, now becomes support.(CHEN, Triangle, 2021)

An ascending triangle is generally considered to be a continuation pattern, meaning that the pattern is significant if it occurs within an uptrend or downtrend. Once the breakout from the triangle occurs, traders tend to aggressively buy or sell the asset depending on which direction the price broke out.

Increasing volume helps to confirm the breakout, as it shows rising interest as the price moves out of the pattern (MITCHELL, 2022)

Example:

Figure 23: Ascending triangle by Julie bang investopedia.com



How to Trade an Ascending Triangle

For trading purposes, an entry is typically taken when the price breaks out. Buy if the breakout occurs to the upside, or short/sell if a breakout occurs to the downside. A stop loss is placed just outside the opposite side of the pattern. For example, if a long trade is taken on an upside breakout, a stop loss is placed just below the lower trendline. (MITCHELL, 2022)

Descending Triangle:

A descending triangle is an inverted version of the ascending triangle and considered a breakdown pattern. The lower trendline should be horizontal, connecting near identical lows. The upper trendline declines diagonally toward the apex. The breakdown occurs when the price collapses through the lower horizontal trendline support as a downtrend resumes. The lower trendline, which was support, now becomes resistance. (CHEN, Triangle, 2021)

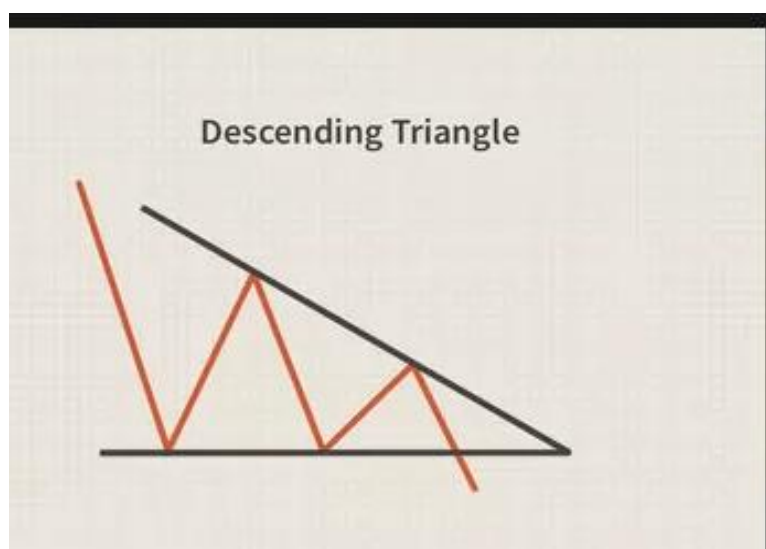
Descending triangles are a very popular chart pattern among traders because it clearly shows that the demand for an asset, derivative or commodity is weakening. When the price breaks below the lower support, it is a clear indication that downside momentum is likely to continue or become even stronger. Descending triangles give technical traders the opportunity to make substantial profits over a brief period of time. Descending triangles can form as a reversal pattern to an uptrend, but they are generally seen as bearish continuation patterns. (CHEN, Descending Triangle Definition, 2021)

Trading a Descending Triangle

Most traders look to initiate a short position following a high volume breakdown from lower trend line support in a descending triangle chart pattern. In general, the price target for the chart pattern is equal to the entry price minus the vertical height between the two trend lines at the time of the breakdown. The upper trend line resistance also serves as a stop-loss level for traders to limit their potential losses. (CHEN, Descending Triangle Definition, 2021)

Example:

Figure 24: Descending triangle by Julie bang investopedia.com



Symmetrical Triangle

A symmetrical triangle is composed of a diagonal falling upper trendline and a diagonally rising lower trendline. As the price moves toward the apex, it will inevitably breach the upper trendline for a breakout and uptrend on rising prices or breach the lower trendline forming a breakdown and downtrend with falling prices.(CHEN, Triangle, 2021)

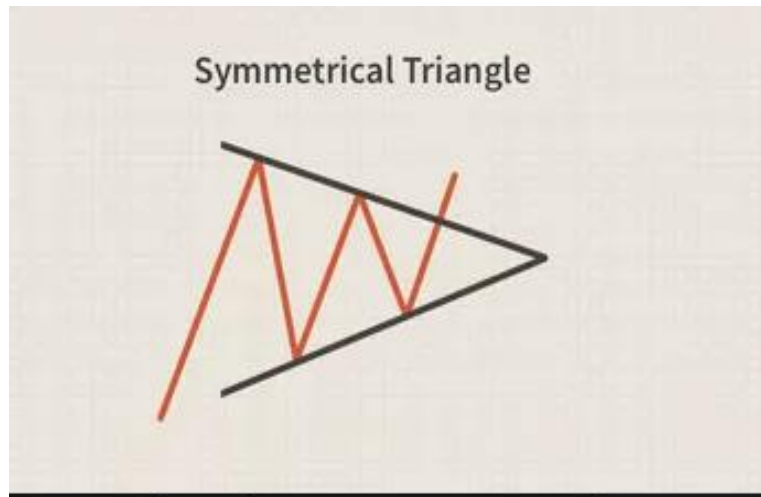
A symmetrical triangle chart pattern represents a period of consolidation before the price is forced to breakout or breakdown. A breakdown from the lower trendline marks the start of a new bearish trend, while a breakout from the upper trendline indicates the start of a new bullish trend. The pattern is also known as a wedge chart pattern.

The price target for a breakout or breakdown from a symmetrical triangle is equal to the distance from the high and low of the earliest part of the pattern applied to the breakout price point. For example, a symmetrical triangle pattern might start at a low of \$10 and move up to \$15 before the price range narrows over time. A breakout from \$12 would imply a price target of \$17, or $\$15 - \$10 = \$5$, then $+ \$12 = \17 .

The stop-loss for the symmetrical triangle pattern is often just below the breakout point. For example, if the aforementioned security breaks out from \$12 on high volume, traders will often place a stop-loss just below \$12.(CHEN, Symmetrical Triangle Definition, 2021)

Example:

Figure 25: Symmetrical triangle by Julie bang investopedia.com



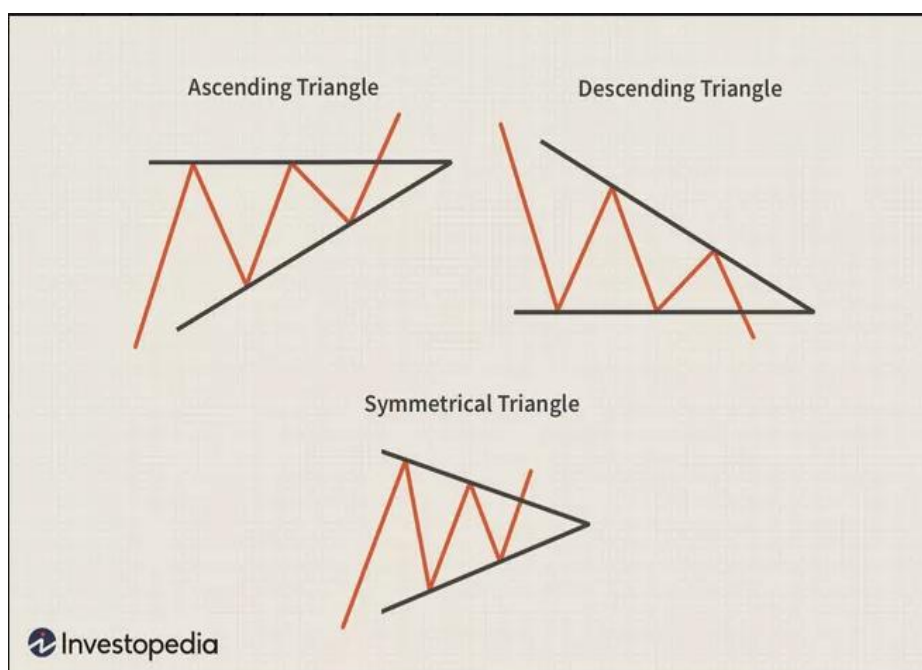
The Difference between an Ascending Triangle and a Descending Triangle and a symmetrical triangle

An Ascending Triangle and a Descending Triangle, these two types of triangles are both continuation patterns, except they have a different look. The descending triangle has a horizontal lower line, while the upper trendline is descending. This is the opposite of the ascending triangle, which has a rising lower trendline and a horizontal upper trendline. (MITCHELL, 2022)

Symmetrical triangles differ from ascending triangles and descending triangles in that the upper and lower trendlines are both sloping towards a center point. In contrast, ascending triangles have a horizontal upper trendline, predicting a potential breakout higher, and descending triangles have a horizontal lower trendline, predicting a potential breakdown lower. (CHEN, Symmetrical Triangle Definition, 2021)

Example of the triangle types:

Figure 26: Triangles patterns Types by Julie Bang investopedia.com



Technical models patterns

There are a lot of technical patterns model in trading we will focus on 2 types of them

a. Head and Shoulders Pattern

A head and shoulders pattern is a chart formation that appears as a baseline with three peaks, where the outside two are close in height and the middle is highest. In technical analysis, a head and shoulders pattern describes a specific chart formation that predicts a bullish-to-bearish trend reversal. The head and shoulders pattern is believed to be one of the most reliable trend reversal patterns. It is one of several top patterns that signal, with varying degrees of accuracy, that an upward trend is nearing its end.(HAYES, Head and Shoulders Pattern, 2022)

Figure 27: head and shoulders patterns example.(HAYES, Head and Shoulders Pattern, 2022)



According to (HAYES, Trading range, 2021) the head and shoulders pattern is comprised of three component parts:

1. After long bullish trends, the price rises to a peak and subsequently declines to form a trough.
2. The price rises again to form a second high substantially above the initial peak and declines again.
3. The price rises a third time, but only to the level of the first peak, before declining once more.

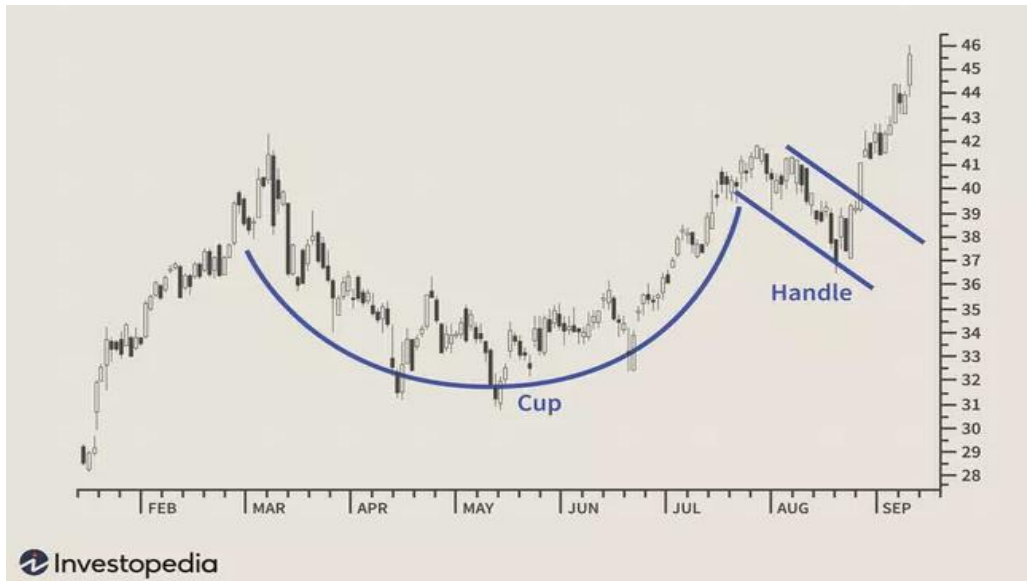
The first and third peaks are shoulders, and the second peak forms the head. The line connecting the first and second troughs is called the neckline.

An inverse or reverse head and shoulders pattern is also a reliable indicator that can signal that a downward trend is about to reverse into an upward trend. In this case, the stock's price reaches three consecutive lows, separated by temporary rallies. Of these, the second trough is the lowest (the head) and the first and third are slightly shallower (the shoulders). The final rally after the third dip signals that the bearish trend has reversed and prices are likely to keep rallying upward.(HAYES, Head and Shoulders Pattern, 2022)

b. Cup and Handle pattern

A cup and handle price pattern on a security's price chart is a technical indicator that resembles a cup with a handle, where the cup is in the shape of a "u" and the handle has a slight downward drift. The cup and handle is considered a bullish signal, with the right-hand side of the pattern typically experiencing lower trading volume. The technical traders using this indicator should place a stop buy order slightly above the upper trendline of the handle part of the pattern.(CHEN, Cup and Handle Definition, 2022)

Figure 28: cup and handle patterns example. (CHEN, Cup and Handle Definition, 2022)



A cup and handle is a technical indicator where the price movement of a security resembles a “cup” followed by a downward trending price pattern. This drop, or “handle” is meant to signal a buying opportunity to go long on a security. When this part of the price formation is over, the security may reverse course and reach new highs. Typically, cup and handle patterns fall between seven weeks to over a year.(CHEN, Cup and Handle Definition, 2022)

Chapter 4 Case Study of tradingview

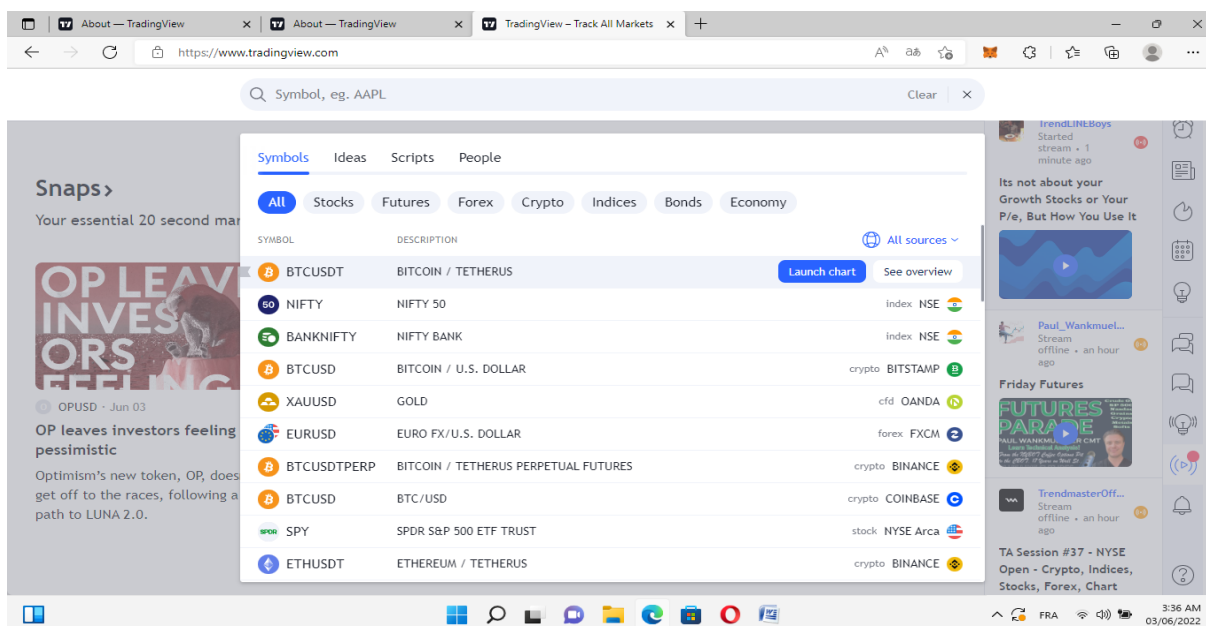
4-1-Exploratory studies to the trading view

1. Introduction to tradingview

Tradingview's traders are empowered by professional-grade tools, real-time data, and helpful ideas that were once only available to professional traders. Using Tradingview can boost the knowledge of markets, methods, and techniques, while allowing a perfect charting and trading skills. (5 things you should never do on TradingView, 2020)

In the next figure we going to show the tradingview platform

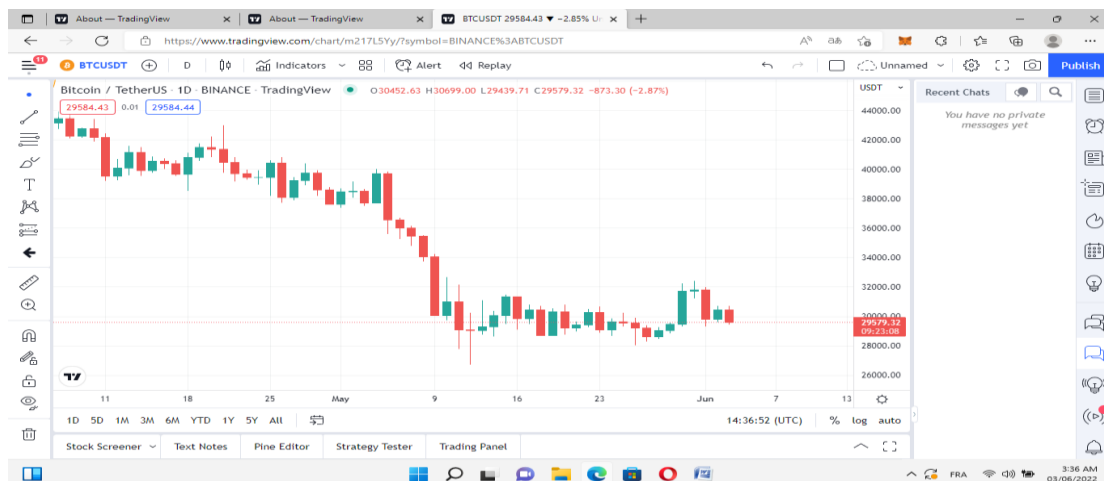
Figure 29: the tradingview platform overview from tradingview.com



This is the table of symbols markets, anyone can choose his own symbol then launch a chart and start analyzing his market.

For example we are choosing the market Bitcoin/Tethers for doing our own analysis

Figure 30: the market Bitcoin/Tethers from tradingview.com



2. Analysis priorities

We are now going to discuss some important priorities of a market analysis from our previous studies

a) Time frames

As we mentioned from (FUNDORA, 2022) time frame refers to the amount of time that a trend lasts for in a market, which can be identified and used by traders.

Figure 31 the time frame in tradingview.com



In this figure appears a list that contain a different types of time (seconds, minutes, hours, days, weeks...) these are the time frames and anyone could choose his perfect time frame and start trading.

The spread

We all discovered from (SEGAL, 2022) That a spread can have several meanings in finance. Generally, the spread refers to the difference between two prices, rates, or yields. In one of the most common definitions, the spread is the gap between the bid and the ask prices of a security or asset, like a stock, bond, or commodity. This is known as a bid-ask spread.

Figure 32: the spread on bitcoin/tether us market from tradingview.com

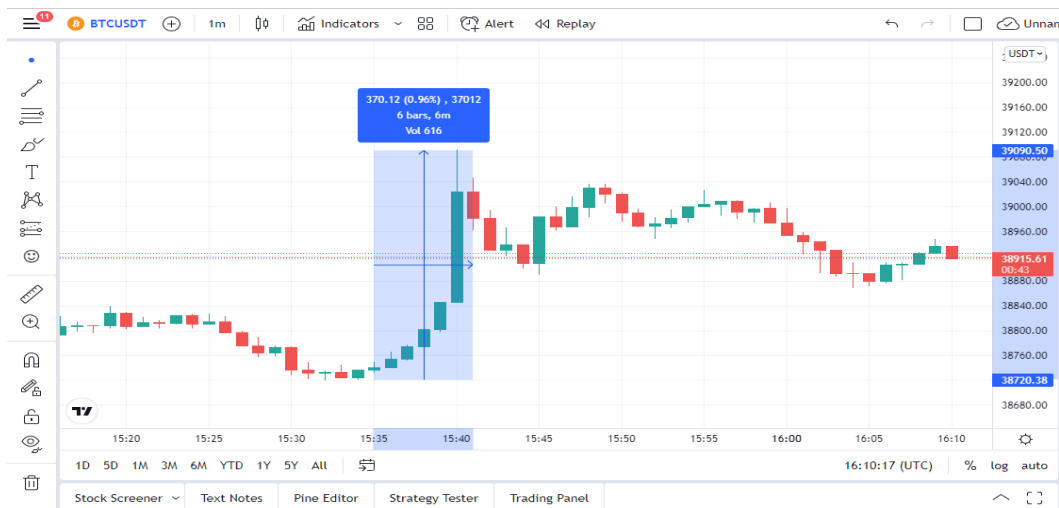


On this figure we see the spread on bitcoin/tether us market from tradingview.com with the current price.

b) The Bips

Basis points, otherwise known as bps or "bips," are a unit of measure used in finance to describe the percentage change in the value or rate of a financial instrument. (LANGAGER, 2021)

Figure 33: the bips in BTCUSDT market in tradingview.com



4-2: Empirical research

1. the effect of the Japanese candlesticks on the market chart

a) Doji

According to (Chen, 2022) ,Doji is a name for a session in which the candlestick for a security has an open and close that are virtually equal and are often components in patterns. Doji candlesticks look like a cross, inverted cross, or plus sign. Alone, doji are neutral patterns that are also featured in a number of important patterns

Doji it's an important reversal candles that it might predict the path of the market

For example in the next figure

Figure 34: doji candle in BTC/USDT market chart from tradingview.com



We notice the reflection after the doji candlestick

b) Dark cloud cover

Dark Cloud Cover is a bearish reversal candlestick pattern where a down candle (typically black or red) opens above the close of the prior up candle (typically white or green), and then closes below the midpoint of the up candle. (MITCHELL, Dark Cloud Cover, 2021)

Dark cloud cover it's an important reversal candles pattern that it might predict the path of the market

For example in the next figure

Figure 35: dark cloud cover candlestick in BTC/USDT market chart from tradingview.com



We notice the reflection after the Dark Cloud Cover candlestick

c) Hammer

Accordingly to (MITCHELL, hammer candlestick, 2022) the hammer is a price pattern in candlestick charting that occurs when a security trades significantly lower than its opening, but rallies within the period to close near the opening price. This pattern forms a hammer-shaped candlestick, in which the lower shadow is at least twice the size of the real body. The body of the candlestick represents the difference between the open and closing prices, while the shadow shows the high and low prices for the period.

Hammer it's an important reversal candle that it might predict the path of the market

For example in the next figure

Figure 36: hammer candle in BTC/USDT market chart from tradingview.com



We notice the reflection after the hammer candlestick

d) Hanging man

The hanging man is a type of candlestick pattern. Candlesticks display the high, low, opening, and closing prices for a security for a specific time frame. Candlesticks reflect the impact of investors' emotions on security prices and are used by some technical traders to determine when to enter and exit trades. (KURT, 2022)

Hanging man is an important reversal candle that it might predict the path of the market

For example in the next figure

Figure 37: hanging man candlestick in BTC/USDT market chart from tradingview.com



We notice the reflection after the hanging man candlestick

2. The effect of the electronic trading indicators and the technical models patterns in the market chart

a) electronic trading indicators

• Moving average convergence divergence (MACD)

Moving average convergence divergence (MACD) is a trend-following momentum indicator that shows the relationship between two moving averages of a security's price. The MACD is calculated by subtracting the 26-period exponential moving average (EMA) from the 12-period EMA. (FERNANDO, 2022)

The MACD is one of the important indicators that it make it easy for traders for prepare their own analysis, and it's also help for expecting the path of the market

For example in the next figure

Figure 38: MACD Crossover in BTC/USDT market from tradingview.com



In this figure we noticed that in all of the intersection of lines means a reflection the market price,

• Bollinger Band

A Bollinger Band is a technical analysis tool defined by a set of trendlines plotted two standard deviations (positively and negatively) away from a simple moving average (SMA) of a security's price, but which can be adjusted to user preferences.

Bollinger Bands were developed and copyrighted by famous technical trader John Bollinger, designed to discover opportunities that give investors a higher probability of properly identifying when an asset is oversold or overbought.(HAYES, Bollinger Band®, 2021)

The Bollinger band is one of the important indicators that it make it easy for traders for prepare their own analysis, and it's also help for expecting the path of the market with 2 factors (the squeeze and the breakout)

The next figure shows the **Bollinger band**

Figure 39: Bollinger band in BTC/USDT market from tradingview.com



The next figure shows the **squeeze**

Figure 40: Bollinger band indicator (squeeze) from tradingview.com



When the bands come close together, constricting the moving average, it is called a squeeze

As we see on this figure after every squeeze the market flees

The next figure shows the **breakout**

Figure 41: Bollinger band indicator (breakout) from tradingview.com



When the price reaches or exceeds one of the bands, it is a signal to buy or sell.

As we see on this figure after any breakout the market bounce.

b) the technical models patterns

1. Triangles

The triangles patterns are substantial elements for understanding the chart. As we mentioned before there a lot of types of triangles patterns, we about to show a particular types **ascending, descending and symmetrical** triangle

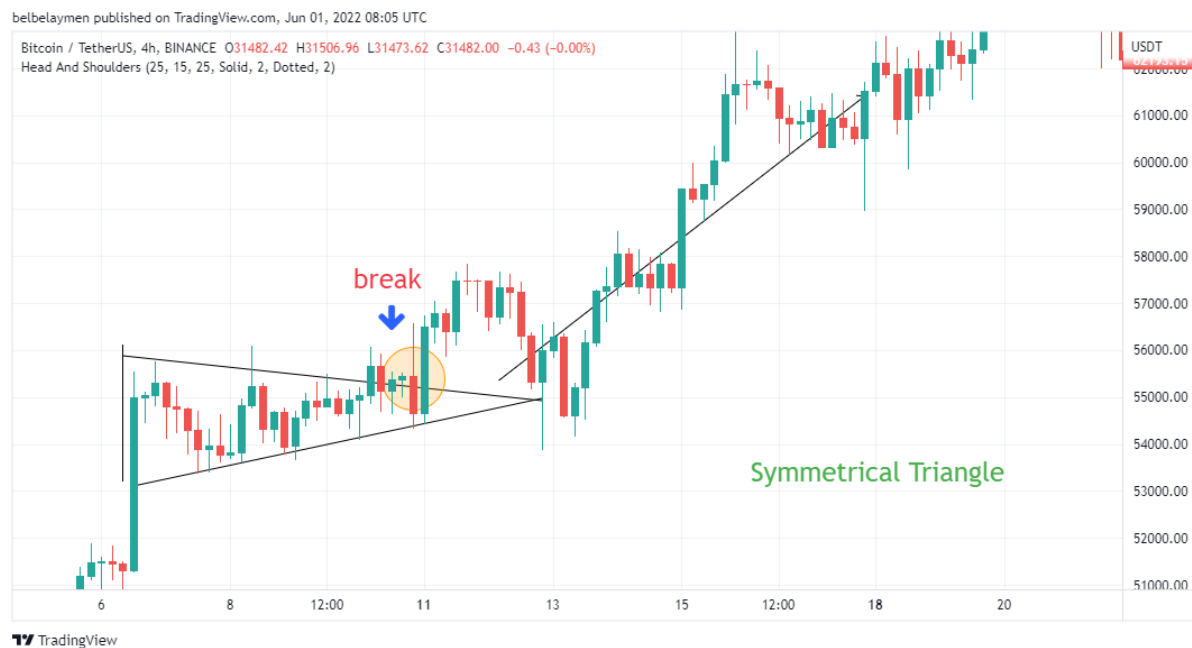
Let's start with the:

• symmetrical triangle

As we knew from (CHEN, Triangle, 2021) that the symmetrical triangle is composed of a diagonal falling upper trendline and a diagonally rising lower trendline. As the price moves toward the apex, it will inevitably breach the upper trendline for a breakout and uptrend on rising prices or breach the lower trendline forming a breakdown and downtrend with falling prices.

In the next figure we are showing an example of a symmetrical triangle and its role for changing the course of the curve.

Figure 42: the role of the symmetrical triangle for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up a symmetrical triangle for us, as we remarked also a breakout from the triangle as we appointed it with a red circle, that signal help us to know the next chart moves, as we said up-break means the market price going higher opposite to that the down-break means the market price going lower in our figure we remarked that the price are going higher after the break.

• Descending triangle

As we knew from (CHEN, Triangle, 2021) that the descending triangle is an inverted version of the ascending triangle and considered a breakdown pattern. The lower trendline should be horizontal, connecting near identical lows. The upper trendline declines diagonally toward the apex. The breakdown occurs when the price collapses through the lower horizontal trendline support as a downtrend resumes. The lower trendline, which was support, now becomes resistance.

In the next figure we are showing an example of descending triangle and its role for changing the course of the curve

Figure 43: the role of the descending triangle for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up a descending triangle for us, as we remarked also a breakout from the triangle as we appointed it with a red circle, that signal help us to know the next chart moves, as we said up-break means the market price going higher opposite to that the down-break means the market price going lower in our figure we remarked that the price are going higher after the break.

In the next figure we going to show a different case a **down-break**

Figure 44: the role of the descending triangle for changing the course of the curve from tradingview.com



In this figure we realize a down-break that actually means that the market price is going lower

• Ascending Triangle

As we knew from (CHEN, Triangle, 2021) that the ascending triangle is a breakout pattern that forms when the price breaches the upper horizontal trendline with rising volume. It is a bullish formation. The upper trendline must be horizontal, indicating nearly identical highs, which form a resistance level. The lower trendline is rising diagonally, indicating higher lows as buyers patiently step up their bids. Eventually, the buyers lose patience and rush into the security above the resistance price, which triggers more buying as the uptrend resumes. The upper trendline, which was formerly a resistance level, now becomes support.

In the next figure we are showing an example of Ascending triangle and its role for changing the course of the curve

Figure 45: the role of the ascending triangle for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up an ascending triangle for us, as we remarked also a breakout from the triangle as we appointed it with a red circle, that signal helps us to know the next chart moves, as we said up-break means the market price going higher opposite to that the down-break means the market price going lower in our figure we remarked that the price is going higher after the break

2. Technical models patterns

a) The head and shoulders patterns

We all knew from (HAYES, Head and Shoulders Pattern, 2022) that the head and shoulders pattern is a chart formation that appears as a baseline with three peaks, where the outside two are close in height and the middle is highest. In technical analysis, a head and shoulders pattern describes a specific chart formation that predicts a bullish-to-bearish trend reversal.

In the next figure we are showing an example of a head and shoulders pattern and its role for changing the course of the curve

Figure 46: the role of the head and shoulders patterns for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up a head and shoulders patterns for us, as we mentioned that when the head and shoulders patterns comes from the upper side leads to a dropping price and There we go for real we see the price drops.

In the next figure we going to show a different case a **lower part**

Figure 47: the role of the head and shoulders patterns for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up a head and shoulders patterns for us, as we mentioned that when the head and shoulders patterns comes from the lower side leads to a rising price and There we go for real we see the price rises.

b) Cup and Handle pattern

We all knew from (CHEN, Cup and Handle Definition, 2022) that the cup and handle price pattern on a security's price chart is a technical indicator that resembles a cup with a handle, where the cup is in the shape of a "u" and the handle has a slight downward drift. The cup and handle is considered a bullish signal, with the right-hand side of the pattern typically experiencing lower trading volume.

In the next figure we are showing an example of a the cup and handle price pattern and its role for changing the course of the curve

Figure 48: the role of the cup and handle patterns for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up a cup and handle price pattern for us, as we mentioned that when the cup and handle price pattern comes from the lower side leads to a rising price and There we go for real we see the price rises.

In the next figure we going to show a different case a **upper side**

Figure 49: the role of the cup and handle patterns for changing the course of the curve from tradingview.com



In this figure we noticed that the curves make up a cup and handle price pattern for us, as we mentioned that when the cup and handle price pattern patterns comes from the upper side leads to a dropping price and There we go for real we see the price drops.

3. the technique to sell and buy crypto with Binance

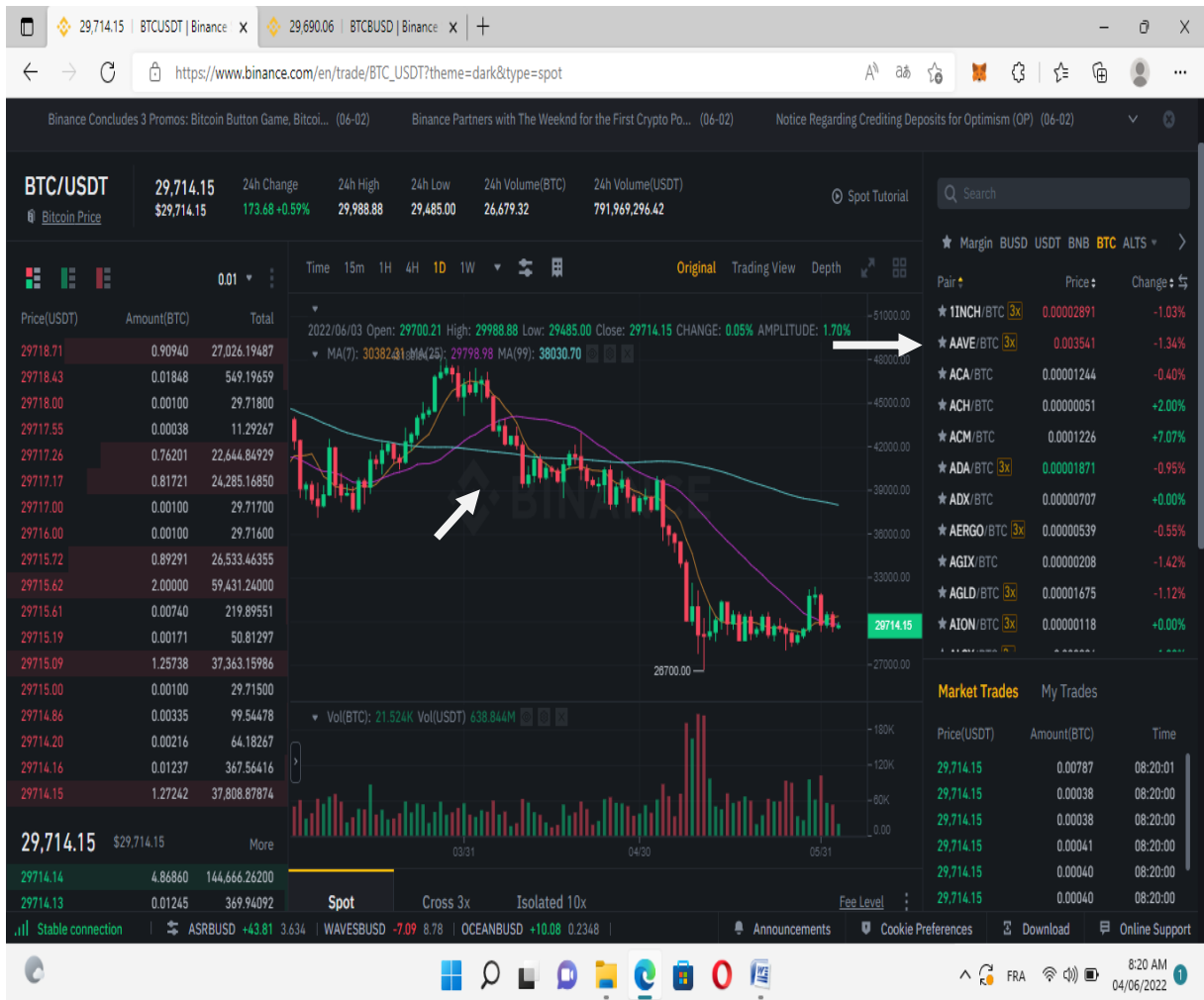
First of all we have to go and make sure to the official Binance website, after login to our account after that we have to go to the (trade) bottom and press (spot) “trade crypto with advanced tools” same as we showing at the next figure

Figure 50: trade with cryptocurrencies in Binance from Binance.com



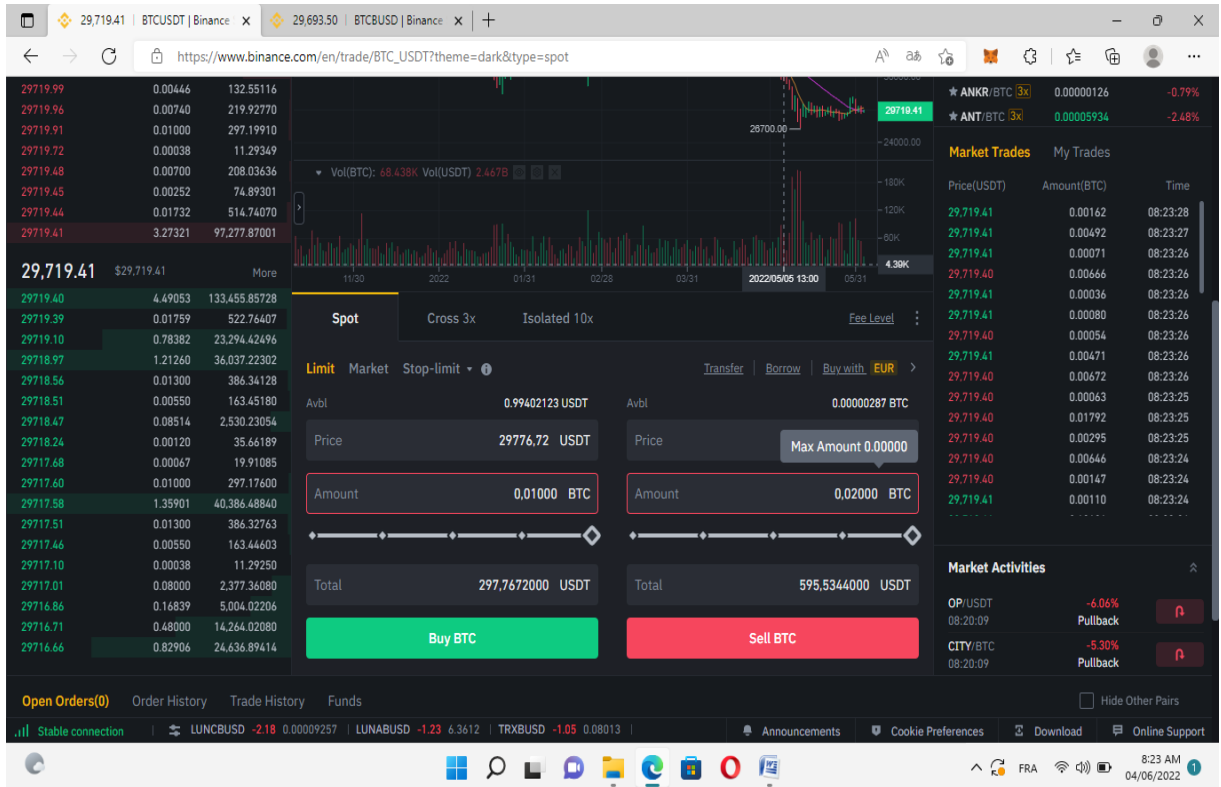
After done the previous step it appears a chart of candles of a random market, on the right side of the chart we find a list of a lot of market we have to choose our market for example BTC/USDT same as we showing in the next figure.

Figure 51: the market chart from binance.com



After choosing our market we move to the next step “trading”. We slide down under the chart it appears an order table. There are 3 types of buying and selling in trading “limit order, market price, and stop limit”. Let’s start with limit order, we choose the buying price then we put the amount that we want to buy it with “BTC” it appears the total of USDT that we should pay, and lunch our order by pressing “buy BTC”, our order get done after the BTC price reach the Buying price that we have chosen it. For example in the next figure we chose the buying price 29776.72 USDT/BTC and the amount 0.1000 BTC=297.7672USDT

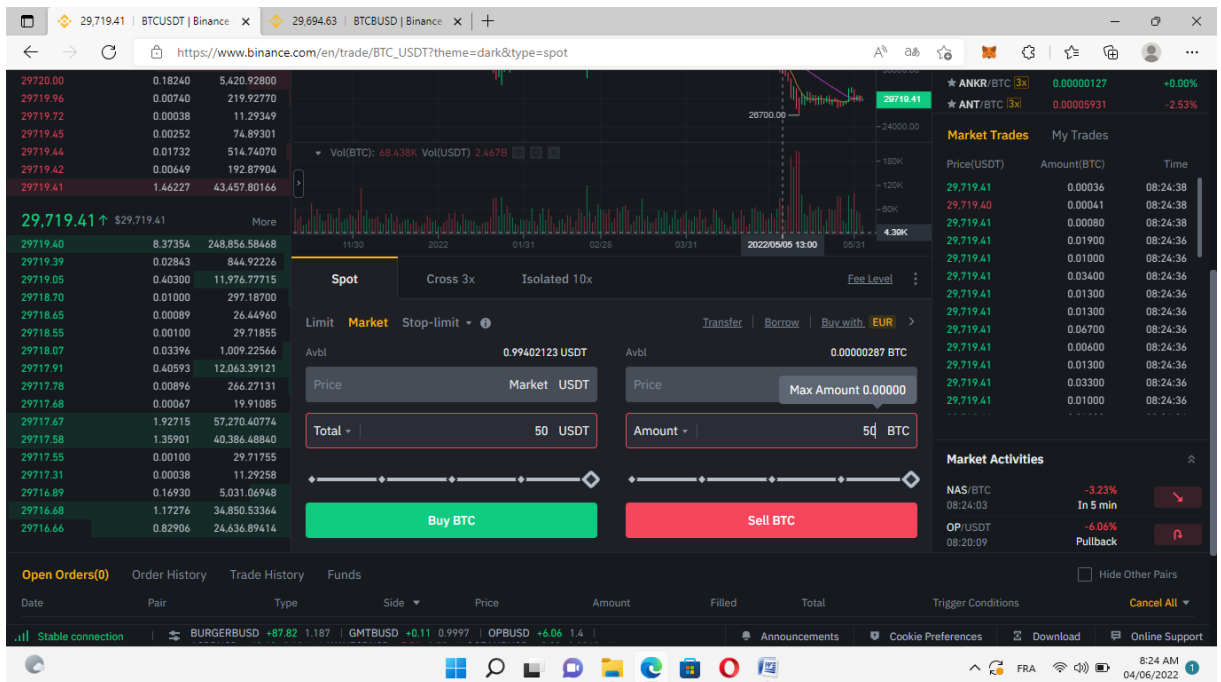
Figure 52: example of trading BTC/USDT with limit order from Binance.com



The same things if we want to sell bitcoin or buy USDT we do the same methods.

Now after knowing the first type we move to the second type “market price” it’s the easiest way to buy, we just have to total amount of USDT that we want to buy BTC with and press “buy BTC” and our order it done , that means we bought Bitcoin with the current price “market price” same as we showing in the next figure.

Figure 53: example of trading BTC/USDT with market price from Binance.com



4-3: Discussion

1. Test hypotheses

Ho1: the cryptocurrencies include cheaper money transfers

After our studies according to (FRANKENFIELD, 2022) we figured out that the advantages of cryptocurrencies include cheaper and faster money transfers and decentralized systems that do not collapse at a single point of failure. Which it can be used to digitally transfer money to another person safely, without having to use intermediaries or trusted third parties

A cryptocurrency is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend. Many cryptocurrencies are decentralized networks based on blockchain technology—a distributed ledger enforced by a disparate network of computers.

Ho2: Bitcoin have the potential of becoming a universal currency

According to (SCHWARZ, 2019) one potential could eventually be the use of Bitcoin as the single world currency. Bitcoin is often used as a pioneer and prime example of crypto currencies - even if the crypto currencies differ from each other also and especially through their technical design. In early 2018, Twitter CEO Jack Dorsey created quite the stir when he declared, “The world ultimately will have a single currency, and the internet will have a single currency.

Ho3: Bitcoin and Ethereum are related.

According to (Aanegola, 2021) the prices of Bitcoin and Ethereum are very strongly associated and this association is a positive one. The prices of the 2 currencies over the last year were plotted as in fig 55/56. The figure shows that there is a strong linear relationship between these currencies. However, this correlation does not necessarily mean causation. It solely refers to a positive association.

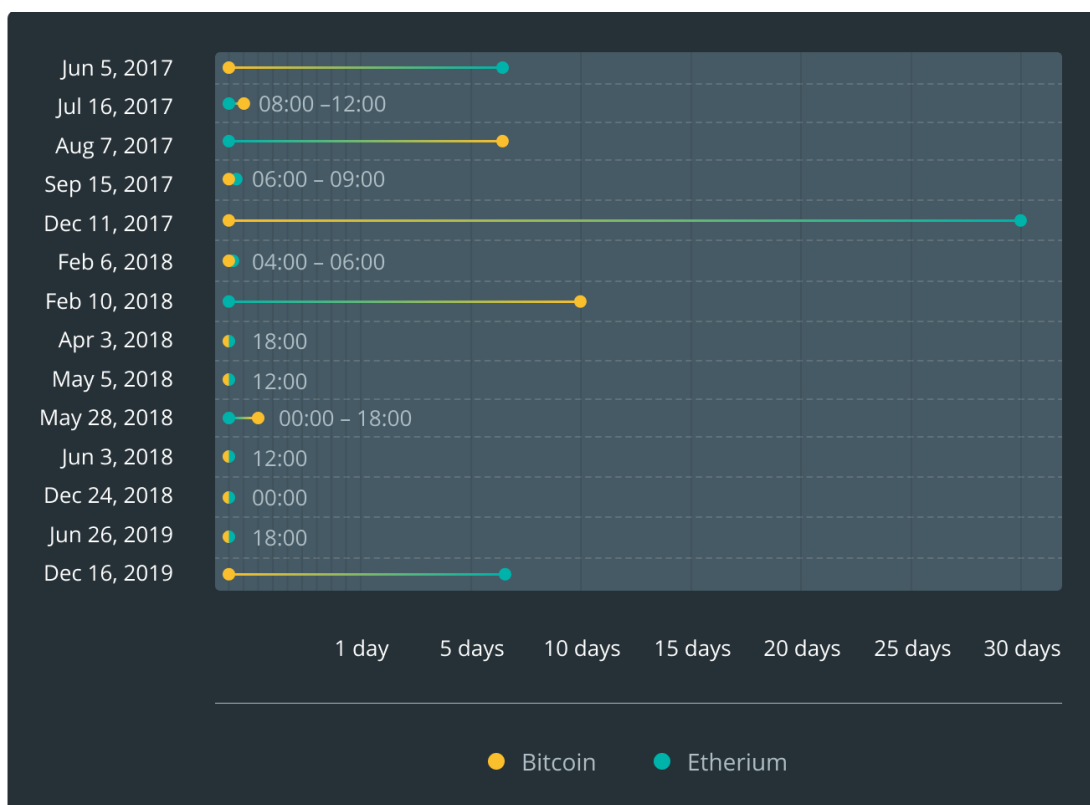
Figure 54: BTC-ETH correlation from (MAGAS, 2020)



Such results were proven by the analysis of 14 significant changes in the price of BTC and ETH that occurred in the period from June 2017 to December 2019, when their correlation

coefficient varied from 0.26 to 0.89. The observation showed that in five out of 14 cases, the ETH price repeated the behavior of BTC — while in four cases, the correlation was negative.

Figure 55: relationship between BTC and ETH price movements from (MAGAS, 2020)



The results presented above are also supported by research conducted by Three Arrows Capital hedge fund’s CEO, Su Zhu. According to his data, BTC and ETH have shown multidirectional dynamics nine times over the past three years.

Finally, after observing the prices graphically, obtaining meaningful conclusions statistically and building a predictive model, it is clear that there is a relationship between the 2 cryptocurrencies.

Ho4: Technical analysis is not mandatory to determine the direction of the market

As we mentioned in our previous studies on the empirical research after testing the technical analyses and technical models we figured out that the technical analyses is one of the important elements to determine the next direction the curves of the markets, so that lead us to denying this hypothesis accordingly to our figures from “fig:35 to fig:50”

Professional traders combine market knowledge with technical indicators to prepare the best trading strategy. Most professional traders will swear by the following indicators. Indicators offer essential information on price, as well as on trend trade signals and give indications on trend reversals.

Technical analysis indicator helps the trader and the investor to know when to enter or exit a trade, in order to make profit. Technical analysis indicator looks at price information and translates it into simple, easy-to-read signals. These signals help the investor determine the correct time to buy or sell.

Conclusion:

At the end of this study, we concluded that cryptocurrencies include cheaper money transfers, and it secured by new network technology and decentralized systems that do not collapse at a single point of failure, and we also knew that Bitcoin have the potential of becoming a universal currency. The prices of Bitcoin and Ethereum are very strongly associated; and this association is a positive one.

After studying the technical analysis and technical models, we found that the technical analysis is one of the important elements to determine the next direction, the curves of the markets even though the professional traders combine market knowledge with technical indicators to prepare the best trading strategy because they helps the trader and the investor to know when to enter or exit a trade.

We should notice that the cryptocurrency and the Forex (foreign exchanges) have the same methods used to analyze their markets either fundamental or technical analysis. We could use the same indicators, the same technical model patterns in the same platform though “tradingview” but they differ on the platform where they get sold in .

The study was inspired by the question: **“How to make benefit from trading with cryptocurrency on electronic platforms?”** » yet during our journeys in reading articles about the cryptocurrencies and the electronic trading besides the chance we had to be trained in this field we successfully formed the topic that we wanted to study and tried to discover the trading with cryptocurrencies in electronic platforms.

In the beginning of our study we understand that cryptocurrency markets are decentralized, which means they are not issued or backed by a central authority such as a government. Instead, they run across a network of computers. However, cryptocurrencies can be bought and sold via exchanges and stored in ‘wallets’.

Unlike traditional currencies, cryptocurrencies exist only as a shared digital record of ownership, stored on a blockchain. When a user wants to send cryptocurrency units to another user, they send it to that user’s digital wallet. The transaction isn’t considered final until it has been verified and added to the blockchain through a process called mining. This is also how new cryptocurrency tokens are usually created.

The study reveals that cryptocurrency is an encrypted data string that denotes a unit of currency. It is monitored and organized by a peer-to-peer network called a blockchain, which also serves as a secure ledger of transactions, buying, selling, e.g, and transferring.

Our study reveals that the technical analysis helps users accurately predict the lows and highs of Bitcoin prices or other currencies over different time periods. Such predictions will help and make educated and data-driven decisions on buying at a good price and selling at a profit.

At the end, we discovered that fundamental analysis focuses on evaluating the “intrinsic value” of an asset. By considering various internal and external factors that could be evaluated whether a cryptocurrency is overvalued or undervalued.

Finally, I suggest that every researcher had to conduct a study of NFT “NON-FUNGIBLE TOKEN” in their next study because this new technology has become one of the most valuable investment types. And it is also electronic.

References

- 10 Best Crypto Exchanges & Platforms of May 2022. (2022, may 01). Retrieved from The College Investor: <https://thecollegeinvestor.com/21245/top-10-bitcoin-crypto-investing-sites/>
- 5 things you should never do on TradingView. (2020, 04 16). Retrieved from Tradingview: <https://www.tradingview.com/support/solutions/43000570848-5-things-you-should-never-do-on-tradingview/>
- Aanegola, R. (2021). Bitcoin and Ethereum: A Deep Dive into Their . *International Journal of New Technology and Research (IJNTR)* , 22.
- Anastasiou, T. (2021, 11 24). *What are Forex Indicators? Discover with nextmarkets*. Retrieved from NEXTMARKETS: <https://www.nextmarkets.com/en/trading/glossary/forex/indicators#:~:text=Forex%20technical%20indicators%20come%20from,analysis%20of%20the%20FX%20market.>
- Antonopoulos, A. M., & Wood, G. (2018). *Mastering Ethereum*. (n. Adams, & K. Brown, Eds.) California, 1005 Gravenstein Highway North, Sebastopol, CA 95472, United States of America: O'Reilly Media.
- Cambridge. (2022, june 08). cryptocurrency. cambridge, cambridge, united kingdom.
- Campisi, N. (2016, september 03). *Some pros and cons of online trading*. Retrieved from the seattle times: <https://www.seattletimes.com/business/some-pros-and-cons-of-online-trading/>
- capital.com. (2019, 04 16). *What is electronic trading?* Retrieved from capital.com: <https://capital.com/electronic-trading-definition>
- CHEN, J. (2022, March 01). *Cup and Handle Definition*. Retrieved from investopedia: <https://www.investopedia.com/terms/c/cupandhandle.asp>
- CHEN, J. (2021, september 29). *Descending Triangle Definition*. Retrieved from investopedia: <https://www.investopedia.com/terms/d/descendingtriangle.asp>
- Chen, J. (2022, 01 09). *Doji Definition*. Retrieved from investopedia: <https://www.investopedia.com/terms/d/doji.asp>
- CHEN, J. (2021, March 04). *Symmetrical Triangle Definition*. Retrieved from investopedia: <https://www.investopedia.com/terms/s/symmetricaltriangle.asp>
- CHEN, J. (2021, september 29). *Trading Platform*. Retrieved from Investopedia: <https://www.investopedia.com/terms/t/trading-platform.asp>
- CHEN, J. (2021, august 19). *trendline*. Retrieved from investopedia: <https://www.investopedia.com/terms/t/trendline.asp>
- CHEN, J. (2021, august 27). *Triangle*. Retrieved from investopedia: <https://www.investopedia.com/terms/t/triangle.asp>
- company, e. (2022, june 13). *use etheruem*. Retrieved from ethereum.org: <https://ethereum.org/en/cryptocurrency-master-bundle2018>the American Bar Association and a Committee of Publishers and Associations.
- Deshpande, P. (2022, february 07). *A step-by-step guide to understanding a crypto whitepaper*. Retrieved from CNBCTV18: <https://www.cnbctv18.com/cryptocurrency/a-step-by-step-guide-to-understanding-a-crypto-whitepaper-12393132.htm>

- FERNANDO, J. (2022, March 01). *Moving Average Convergence Divergence (MACD)*. Retrieved from Investopedia: <https://www.investopedia.com/terms/m/macd.asp>
- Foot, P. (2019). *Japanese candlestick trading guide*. Retrieved from ig.com: <https://www.ig.com/en/trading-strategies/japanese-candlestick-trading-guide-200615#:~:text=A%20Japanese%20candlestick%20is%20a,Steve%20Nison%20in%20the%201990s.>
- FRANKENFIELD, J. (2022, 01 11). *Cryptocurrency*. Retrieved from investopedia: <https://www.investopedia.com/terms/c/cryptocurrency.asp>
- FUNDORA, J. (2022, february 09). *Multiple Time Frames Can Multiply Returns*. Retrieved from investopedia: <https://www.investopedia.com/articles/trading/07/timeframes.asp#toc-time-frame>
- HAYES, A. (2021, july 06). *Bollinger Band®*. Retrieved from investopedia: <https://www.investopedia.com/terms/b/bollingerbands.asp>
- HAYES, A. (2022, March 01). *Head and Shoulders Pattern*. Retrieved from investopedia: <https://www.investopedia.com/terms/h/head-shoulders.asp>
- HAYES, A. (2022, 05 05). *Nasdaq definition*. Retrieved from investopedia: <https://www.investopedia.com/terms/n/nasdaq.asp>
- HAYES, A. (2021, june 25). *Stochastic Oscillator*. Retrieved from investopedia: <https://www.investopedia.com/terms/s/stochasticoscillator.asp>
- HAYES, A. (2021, october 20). *Trading range*. Retrieved from investopedia: <https://www.investopedia.com/terms/t/tradingrange.asp>
- KAGAN, J. (2022, april 10). *Digital wallet*. Retrieved from investopedia: <https://www.investopedia.com/terms/d/digital-wallet.asp>
- KATELYN, P. (2021, july 08). *Binance Exchange*. Retrieved from Investopedia: <https://www.investopedia.com/terms/b/binance-exchange.asp>
- KURT, D. (2022, february 09). *Understanding the 'Hanging Man' Candlestick Pattern*. Retrieved from investopedia: Understanding the 'Hanging Man' Candlestick Pattern
- Iamo, A. (2021, 05 14). *Japanese Candlestick Patterns*. Retrieved from reddit: https://www.reddit.com/r/Daytrading/comments/oj2awt/japanese_candlestick_patterns_free_poster_download/?utm_source=share&utm_medium=mweb3x
- LANGAGER, C. (2021, June 30). *Basis point (bps)*. Retrieved from investopedia: <https://www.investopedia.com/ask/answers/what-basis-point-bps/>
- LEWIS, A. (2018). *the basics of bitcoin and blockchain*. 2850 Douglas Road, 3rd Floor Coral Gables, FL 33134 USA, Florida, USA: Mango Publishing Group, a division of Mango Media Inc.
- LIELACHER, A. (2022, april 08). *Best Crypto Exchanges*. Retrieved from investopedia: <https://www.investopedia.com/best-crypto-exchanges-5071855>
- Ma, J. (2022, june 06). *Roadmap*. Retrieved from Binance academy : <https://academy.binance.com/en/glossary/roadmap>
- MAGAS, J. (2020, february 08). *Truth About Crypto Price Correlation: How Closely Does ETH Follow BTC?* Retrieved from cointelegraph: <https://cointelegraph.com/news/truth-about-crypto-price-correlation-how-closely-does-eth-follow-btc>
- Marcus, M. (2018, june 15). *The guide of crypto trader* .

- MITCHELL, C. (2022, january 13). *Ascending Triangle*. Retrieved from investopedia:
<https://www.investopedia.com/terms/a/ascendingtriangle.asp>
- MITCHELL, C. (2021, november 19). *Dark Cloud Cover*. Retrieved from investopedia:
<https://www.investopedia.com/terms/d/darkcloud.asp>
- MITCHELL, C. (2022, march 02). *hammer candlestick*. Retrieved from investopedia:
<https://www.investopedia.com/terms/h/hammer.asp>
- MitevaKacarski, F. B.-T. (2017). CRYPTOCURRENCIES – ADVANTAGES AND. Stip, north macedonia, Republic of Macedonia.
- nison, s. (2001). *japanese candlestick charting techniques*. new york, 375 hudson street, United states of America: special markets penguin putnam.
- Quest, M. (2018). *cryptocurrency master bundle*. the American Bar Association and a Committee of Publishers and Associations.
- SCHWARZ, F. (2019). *Bitcoin's potential of becoming a world currency*. Munich: Northern Business School.
- SEGAL, T. (2022, March 10). *Spread definition*. Retrieved from investopedia:
<https://www.investopedia.com/terms/s/spread.asp>
- SMITH, L. (2021, august 25). *Basics of the Mechanics Behind Electronic Trading*. Retrieved from investopedia: <https://www.investopedia.com/articles/investing/110713/basics-mechanics-behind-electronic-trading.asp>
- Sparkes, M. (2022, 02 25). *What is bitcoin and how does it work?* Retrieved from Newscientist:
<https://www.newscientist.com/definition/bitcoin/>
- streissguth, T. (2022, april 26). *Crypto Coin vs. Token: What's the Difference?* Retrieved from GOBankingRates: <https://www.gobankingrates.com/investing/crypto/crypto-coin-vs-token/>
- tradementor. (2008, february 04). *technical analysis : trend, support and resistance* , p. 11.
- WIKIPEDIA. (2022, february 05). *Electronic trading platform*. Retrieved from WIKIPEDIA:
https://en.wikipedia.org/wiki/Electronic_trading_platform
- wikipedia. (2021, june 17). *Nasdaq*. Retrieved from wikipedia:
<https://en.wikipedia.org/wiki/Nasdaq#:~:text=It%20was%20founded%20in%201971,world's%20first%20electronic%20stock%20market.>