A historical excursion through the development of cryptocurrencies in the world

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Abstract

In this paper, the topic of cryptocurrencies is investigated. The aim is to explain the basic characteristics of four selected cryptocurrencies, to show what the investment in these cryptocurrencies would have looked like in the last two years. Each of the cryptocurrencies examined varies greatly in both purpose and effectiveness. We use the methods of performance comparison and technical analysis. The aim of the article is to compare Ethereum and Bitcoin and to show the effect of the coronavirus pandemic on the development of cryptocurrency prices. The results show that investments in Ethereum or Bitcoin have been the most profitable in the last two years. Regarding the period of the coronavirus crisis, the most favorable investment was Ethereum.

Keywords: cryptocurrency, covid, investment, price development, bitcoin, ethereum, blockchain

Introduction

The emergence of cryptocurrencies can be dated to the beginning of the 21st century, more precisely around 2009, when the world was dealing with a financial crisis. The most discussed cryptocurrency in expert circles is Bitcoin (Nadarajah and Chu, 2017). It is a topic that some of us encounter on a daily basis as its price has risen exponentially in recent years (Pickard, 2021). Despite the great popularity of this cryptocurrency, there is only a fraction of experts who understand this cryptocurrency, understand the issue of virtual currencies and the development of their prices.

Despite the volume of the topic of cryptocurrencies, there are still many new, current trends that deserve the readers' attention. In terms of historical development, cryptocurrencies have proved to be very interesting worldwide in a relatively short time, whether for economic or financial reasons (Akhmatov and Roienko, 2020). The concept of globalization also comes with new modern technologies that allow us to conduct transactions worldwide in seconds, to communicate in a way that people could not even have imagined 20 years ago or invest from the comfort of our home. What can and probably has affected the price of cryptocurrencies is the coronavirus crisis. Akhtaruzzaman, Boubaker and Sensoy (2021) deal with this topic not only from a financial point of view.

Cryptocurrencies already have a global impact and great things can be expected of them in the future. Some even consider cryptocurrencies to be the invention of the century. Suyambu, Thiraviya and Janakirani (2020) share this view, but also mention other options. Everyone must have heard of Bitcoin, but what about Ethereum, Ripple or Litecoin?

So, what did the history and price development of the most famous 4 cryptocurrencies look from 2009 to 2021? What are the main differences in the characteristics of the 4 cryptocurrencies and what makes each one interesting? What is the impact of the coronavirus crisis on the development of cryptocurrency prices? How does the purpose and properties of the second best-known cryptocurrency, Ethereum, differ from the giant known as Bitcoin? Bringing answers and offering a historical excursion are the aims of this paper.

The aim of this paper is to make a historical excursion of cryptocurrencies from 2009 to the present and to find out how much an invested USD100 in cryptocurrencies one and two years ago would have earned. Subsequently, we present the basic differences in the characteristics of the cryptocurrencies Bitcoin, Ethereum, Ripple and Litecoin. Last but not least, we will state the impact of the coronavirus crisis on the development of cryptocurrency prices. Finally, we will mention how the purpose and features of Ethereum differ from Bitcoin and compare them and also show how similar they are.

Within this seminar paper, the following research questions were determined:

V1: What would a USD100 investment in BTC, ETH, XRP, LTC cryptocurrencies look like?

V2: What are the main characteristics of the 4 investigated cryptocurrencies?

V3: How do the purpose and properties of Ethereum differ from Bitcoin and how are they similar?

V4: What impact did the coronavirus crisis have on the development of cryptocurrency prices and what investment was the most profitable?

Literature research

The topic of cryptocurrencies is relatively new, however, the history of money itself dates back thousands of years, when the so-called barter trade was the equivalent of money. Through metal currency to paper money, we have reached a time when society operates on the basis of payment cards and now also cryptocurrencies. Allen and Bryant (2019) give a brief history, overview and characteristics of money. As for the current monetary system, it operates on two major currencies - the euro and the dollar (Rzayeva, 2019). Fauzi et al. (2020) argue that now is the time for the rise of virtual currencies and digital coins traded through the blockchain market. Rzayeva (2019) shares this view and also argues that the market needs to be transformed, adding that this process of adaptation will be long and unpredictable.

The main goal of each country is to ensure sustainable economic growth (Rzayeva, 2019). This growth brings countries together into one global system through monetary policy (Rzayeva, 2019). Lapina et al. (2020) argue that despite the global approach to cryptocurrencies, each country views them differently. In Switzerland, for example, in 2018, the Minister of Economy announced that the country planned to become the first crypto-nation in the world. According to statistics, the country with the largest number of cryptocurrency users is in Nigeria, where they are used mainly due to expensive cross-border transport. In contrast, there are countries where cryptocurrencies are illegal - Algeria, Saudi Arabia, Bolivia (Nasir et al., 2020).

Cryptocurrencies serve mainly as a digital asset, speculative investment, exchange medium (online), form of payment or for non-monetary use (Gil-Cordero, Cabrera-Sánchez and Arrás-Cortés, 2020). Transactions work via a so-called blockchain. Weiss et al. (2019) characterize blockchain as a database technology that is decentralized and in which the data owner has constant control. Their decentralization makes them exceptional. Forte, Romano and Schmid (2015) are of the opinion that blockchain technology is one of the first identifiable implementations of decentralization models that have the potential to reorganize all possible types of human activities.

Gidea et al. (2020) analyze four major cryptocurrencies (Bitcoin, Ethereum, Litecoin, and Ripple) and use time series analysis as well as topological data analysis. Casino, Dasaklis and Patsakis. (2019) aimed to describe and explore the current state of blockchain technologies on the basis of a structured, systematic overview and thematic content analysis and their possible applications. Dibrova (2016) works with an overall analysis and estimation of risks related to possible development as well as insufficient regulation, where it indicates the extent of potential development of cryptocurrencies. Gil-Cordero, Cabrera-Sánchez and Arrás-Cortés, (2020) examines the factors that influence the intention to use cryptocurrencies by creating a new research model and using the "Partial Least Squares" (PLS) method by collecting data and measuring variables. Casino, Dasaklis and Patsakis (2019) use descriptive analyzes of 260 articles between 2014 and 2018 to provide interesting insights into current research trends in blockchain technologies and its application.

Bitcoin is often compared to the gold standard due to inflation and is called digital gold. Dyhrberg (2016) largely deals with this topic, where they describe the advantages, disadvantages of bitcoin against the US dollar. The safety of cryptocurrencies is also an issue. It is difficult to really find out who made the payment, so it can be used to buy weapons or support terrorist attacks (Lapina et al., 2020). Dibrova (2016) shares this view, where they also cite money laundering or illegal activities in general as examples. In the example, it is similar to dynamite, which was not initially expected to be misused.

The cryptocurrency Ethereum holds the second place in terms of market capitalization. The common characteristics of Ethereum and Bitcoin is that they are both decentralized and run on a blockchain database. Ferretti and D'Angelo (2020) call Ethereum programmable money. Ethereum and Bitcoin each have a completely different purpose and properties. Mariana, Ekaputra and Husodo (2021) obtain data from coindesk.com to analyze the development of Bitcoin and Ethereum as a possible hedge for money in the coronavirus crisis. They also find that Ethereum may be a better hedge than Bitcoin during a short-term stock market downturn, but Ethereum has higher yield volatility than Bitcoin. However, their results are in conflict with Bouri, Shahzad and Roubaud (2020), Conlon and McGee (2020) and Corbet et al. (2021), mainly due to the short-term focus.

The development of the coronavirus crisis has had and will have a significant impact on the cryptocurrency market. The topic is handled by Umar and Gubareva (2020) using wavelet analysis and descriptive statistics for time series. Al-Thaqeb, Algharabali and Alabdulghafour (2020) work with the EPU (Economic Policy Uncertainty) index and also focus on the future development not only of cryptocurrencies, but of the entire market.

To fulfill the goal and answer the research questions, we choose the method of document analysis for data collection and we choose comparative analysis for data processing and evaluation.

Methods and Data

For collecting data with the development of Bitcoin (BTC), Ethereum (ETH), Ripple (XRP) and Litecoin (LTC) cryptocurrencies, we will use document analysis and website analysis. Document analysis is based on Scopus and Web of Science databases. Here we will use the information from previous authors, mainly to determine the volatility of cryptocurrencies. We will focus mainly on the short-term development of all 4 cryptocurrencies since 2019. Gidea et al. (2020) used coindesk.com to collect data, using document analysis. However, we will use bitinfocharts.com, which, as one of the few, offers an overview of the development of Bitcoin since 2010, and finance.yahoo.com for the remaining cryptocurrencies. The website provides an overview of current prices and the history of each cryptocurrency. We also compare the development and volatility of each of the cryptocurrencies. The impact of the coronavirus crisis will be assessed from January 2020 to April 2021. The assessment will once again be based on data from finance.yahoo.com.

We will use the following methods for data processing: comparison method, technical analysis. We will compare the 4 aforementioned cryptocurrencies, according to the time point of view, with the help of Excel charts, which will serve as the main tool for calculating the highest profitability. Of the two investment models, the most important will be the profit, which we calculate using data from the chart. For both models, we will calculate the value of cryptocurrencies that can be purchased for USD100. We then calculate the percentual profit for each model (2019-2020 and 2019-2021). Finally, we calculate the net profit from the percentual profit (i.e., subtract the original investment of USD100). We will also use the comparison method to compare cryptocurrencies, but here we will focus more on how they differ and how they are similar. We will use this method mainly to compare Bitcoin and Ethereum. The data is based mainly on internet sources - databases, websites.

Results

Before you decide to invest in cryptocurrencies, you need to know at least the basic characteristics. Although the development of BTC and ETH does not have such a historical range as, for example, shares or bonds, both cryptocurrencies showed an average annual growth of up to 500% in a short timeframe (only the last 2 years were examined). We would also state here that the two cryptocurrencies do not have an inverse relationship to each other, i.e., when one decreases, the other may increase, as the two cryptocurrencies are very different and each have a different target.

The research is that USD100 is invested in each of the 4 cryptocurrencies mentioned. We will compare 2 periods - from May 2, 2019, to May 2, 2020 (annual) and from May 2, 2019, to May 2, 2021. We present all developments in charts. In order for everyone to be able to imagine the percentage growth, we will also present the net profit in Czech crowns (CZK). As for the exchange rate of the US dollar against the Czech crown, it will be based on the arithmetic average for the given year(s). We will then compare and evaluate which investment would have paid off the most. Graph 1 shows the development of price of USD against CZK.

USD/CZK

The exchange rate of the US dollar fluctuates just like any other currency. During the period under review, the lowest exchange rate was 21.14 USD/CZK (i.e., the Czech koruna was the strongest at this point). In contrast, the highest exchange rate was 26.03 USD/CZK (the least suitable for exchanging CZK to USD). In order to carry out the research without complications, we calculated an average of 22.51 USD/CZK in a one-year period and 22.85 USD/CZK in a two-year period. We have already mentioned that the investment was 100 USD/CZK, i.e., in the one-year period it is 2,251.09 CZK and 2,285.49 CZK in the two-year period.



Graph 1: USD/CZK development chart

Source: Authors.

Bitcoin is based on a blockchain and works as a secure decentralized payment system. This is the first established cryptocurrency, launched in 2009, with the greatest liquidity. Almost every country allows this method of payment. The network itself verifies that payments are legitimate and not misused. BTC has the largest market capitalization (1TR/USD) of all cryptocurrencies, whether it will keep its position is pure speculation though. BTC is obtained either by purchasing or mining on your computer, where your computer solves complex equations. The main purpose of BTC was to serve as an alternative to other fiat currencies (\mathcal{E} , \in , CZK) operating in the given countries. It serves as a store of value and also as a medium of exchange. Graph 2 shows the development of the BTC price in USD.





Source: Authors.

BTC/USD/CZK

Bitcoin, as the best-known cryptocurrency and with the largest market capitalization, now does not appear to be a bad investment. Unfortunately, cryptocurrency is highly volatile, so it is important when to buy. First, we will present a one-year investment model. 100 USD (2,251.09 CZK) was purchased on May 2, 2019, at a price of 1 BTC for 5,520 USD. For this amount, we obtained 0.0181159 BTC, which doesn't look like a big number. Therefore, if we take into account the average exchange rate of 22.51 USD/CZK and not investing more money in this cryptocurrency, we will have 0.0293596 BTC on the same day a year later, i.e., the price of 1 BTC rose from USD 5,520 to USD 8,946 during the year, which is a growth of 62%. The portfolio is now worth USD162.07 and the net profit is USD62.07. This model ended with the money being withdrawn on that day and no longer being invested. We will now compare this model with a two-year model. In this model, the money was not withdrawn from the bitcoin exchange, but was left in the account so that it could continue to grow. If we take it from the beginning of the investment, we have 0.0181159 BTC in 2019 at a price of 5,520 USD. The change is now in the USD/CZK exchange rate, which now stands at 22.85 instead of the original 22.51. We do not invest any more money in the account within the two years and wait for the market to develop. After two years, we find that out of the original amount of 0.0181159 BTC, we now have 0.1871193 BTC, or 1,032.90 USD (23,601 CZK). Thus, net profit is 932.90 USD and percentage growth over those two years is 1,033%. The price for 1 BTC is now (May 2, 2021) 57,016 USD (1,186,924 CZK).

BTC				
Date	Price for 1 BTC	100USD/BTC	% Growth	Net profit
May 2, 2021	57,016	0.1690034	933%	\$ 932.90
May 2, 2020	8,946	0.0293596	162%	\$ 162.07
May 2, 2019	5,520	0.0181159	100%	Х

Tab. 1: Results	of Bitcoin
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Source: Authors.

Ethereum was founded in 2015 and serves as a software platform (also based on blockchain), which enables decentralized transactions. From the beginning, ETH has been more than just a payment system, giving developers more opportunities to create new applications. ETH recorded growth of up to 13,000% between 2014–2017 (Bhosale and Mavale, 2018). Ethereum is mined in a similar way to BTC, but with ETH, miners charge a fee for confirming the transaction, in so-called tokens, which power the ETH network. It is currently the most developed blockchain project in the world with a market capitalization of around 450B/USD. Most decentralized applications are based on Ethereum. ETH uses the Ether currency, which is used only in the Ethereum network. Graph 3 shows the development of the Ethereum price in USD.



Graph 2: ETH-USD development chart

Source: Authors.

ETH/USD/CZK

Ethereum is popular mainly due to its potential use in the future. So let's start, as with BTC, by introducing two models. The first is a one-year investment, starting on 2 May 2019, and ending on 2 May, 2020. The USD/CZK exchange rate is the same as for investments in BTC (2,251.09 CZK in the first period and 2,285.49 in the second). We invest 100 USD at the price of 162.12 USD for 1 ETH. From this, we will have 0.616816438 ETH. As with BTC, we do not invest any more money in the account and wait 1 year. After this time, we will have 0.819232356 ETH in our account, which represents a 33% increase, and from the initial amount we will have 132.82 USD (2,989 CZK). Net profit is 32.82 USD. In the second model (22.85 CZK / USD), Ethereum price developed from the original 0.616816438 ETH to the incredible 11.23146718 ETH, which is 1,820.88 USD (4,1607 CZK). Net profit is 1,720.88 USD and percentage growth is as high as 1,721%. That is, from the original price in 162.12 (2019) to 2,952.06 (2021) for 1 ETH.

ЕТН				
Date	Price for 1 ETH	100USD/ETH	% growth	Net profit
May 2, 2021	2952.06	11.23146718	1,821%	\$ 1,720.88
May 2, 2020	215.33	0.819232356	133%	\$ 32.82
May 2, 2019	162.12	0.616816438	100%	Х

Tab. 2: Results of Ethereum

Source: Authors.

Litecoin was created in 2011 and was supposed to be something like silver to Bitcoin gold (Hameed and Farooq, 2017). It currently holds 11th place in terms of market capitalization. Like BTC, Litecoin is based on a global payment network (open source) and is not controlled by any official body or bank. It also works on similar source code as BTC.

There is another similarity between Bitcoin, in that it is limited to a certain number - 84,000,000 pieces (compared to 21,000,000 pieces of BTC). Le Tran and Leirvik (2020) state that from their research, LTC is the most effective cryptocurrency and Ripple the least effective cryptocurrency. This year's data suggests that LTC would not be a bad investment, but there are better alternatives in terms of growth. LTC is designed to be used for cheaper transactions and to be more efficient for everyday use. Graph 4 shows the development of the LTC price in USD.





Source: Authors.

LTC/USD/CZK

The last cryptocurrency examined is Bitcoin-based cryptocurrency. The first model starts at 73.77718 USD for 1 LTC. For 100 USD, therefore, it is 1.35543274 LTC (2019). After 1 year (exchange rate 22.51 CZK/USD), the value of the portfolio, as with XRP, is in the red by 33%. We now have only 0.90813994 LTC (price 1 LTC - 49.45805 USD) and we are at a loss of 33 USD (742.83 CZK). The second model, from 1.35543274 LTC, will generate 4.94397989 LTC, i.e., a net profit of 264.7529 USD and the portfolio price is now worth 364.7529 USD (CZK 8,334).

Tab. 3:	Litecoin	results
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LTC				
Date	Price for 1 LTC	100USD/LTC	% growth	Net profit
May 2, 2021	269.10437	4.943979887	365%	\$264.75
May 2, 2020	49.458046	0.908139937	67%	\$-33.00
May 2, 2019	73.777176	1.355432743	100%	Х

Source: Authors.

Ripple is a technology that serves as a cryptocurrency and at the same time as a digital payment network through which transactions can be made between two currencies or networks. It was created in 2012 (Hameed and Farooq, 2017). It currently has the 7th largest market capitalization (in 2020 it was in 3rd place). XRP was created by Ripple Labs, for the purpose of an electronic payment system called the "Ripple Consensus Protocol" (Hameed and Farooq, 2017). Ripple is just a company name, while XRP is the cryptocurrency token itself. XRP is unique in that it works like a currency exchange with a low commission (it pays off when you want to exchange money but don't want to pay large fees). Another interesting thing is the speed of payment itself, where the average time is only 4 seconds (the fastest of all 4 analyzed). In terms of energy, the consumption of XRP is much lower than that of BTC mining. As one of the few cryptocurrencies, XRP has support from a large number of banks (Union Credit, BoA, NBF, American Express). Graph 5 shows the development of the XRP price in USD.



Graph 4: XRP-USD development chart

Source: Authors.

XRP/USD/CZK

We will use the same principles and resources again - 100 USD and 2 models. We start at 0.303239 XRP for 1 USD (30.3239 XRP). Under the same conditions, after 1 year we will be at a loss of 26.16%. That is, from the original 30.3239 XRP to just 22.439686. Therefore 74 USD (1,665.74 CZK). What happens if we leave the money in the account for another year (the only change is again at the USD/CZK exchange rate from 22.51 to 22.85)? The price of 1 XRP will change from 0.303239 to 1.562641 over a period of 2 years, i.e., 515% growth and a net profit of USD 415.31663 (CZK 9,489.985). The total value of the portfolio is now 515.31663 USD, and we own 156.2641 XRP, instead of the original 30.3239.

XRP				
Date	Price for 1 XRP	100USD/XRP	% growth	Net profit
May 2, 2021	1.562641	156.2641	515%	\$ 415.32
May 2, 2020	0.223914	22.439686	74%	\$ -26.16
May 2, 2019	0.303239	30.3239	100%	х

Tab. 4: Ripple results

Source: Authors.

How Bitcoin differs from Ethereum

It is important to realize that BTC and ETH are fundamentally different ideas. BTC mainly provides fast and secure transactions, while ETH can offer much more (digital currency, smart contracts, decentralized applications). The number of BTCs is limited to 21,000,000 from the beginning (which makes it rare). In contrast, ETH is not limited in quantity. The ETH and BTC payment processes are not related in any way. While the average time before payment takes about 10 minutes for BTC, it is only 15 seconds for ETH.

What Bitcoin and Ethereum have in common

Both cryptocurrencies are decentralized (they are not issued or regulated by a central bank or other body.). They are also both based on a blockchain, which protects them against most unauthorized manipulations. Each of them is a digital currency, traded through an online exchange (coinbase, robinhood, kraken). Both can be sent from this exchange to your own crypto wallet. Another common characteristic is high volatility (this could characterize all cryptocurrencies), where prices are able to rise or fall by 50% in one hour. Thus, it can be seen here that the prices of cryptocurrencies are driven by speculation (Fauzi et al., 2020).

Development of cryptocurrency prices during the COVID pandemic

The development of the coronavirus pandemic begins in Wuhan, where the first case was reported on December 8, 2019 (Mariana, Ekaputra and Husodo., 2021). However, for the purposes of this work, we will compare data from the site finance.yahoo.com from February 15, 2020, to May 2, 2021. The lowest values were reached on March 13, 2020 (about -50%), similarly to the stock market. The main factor in this fall was the declaration of a global pandemic by the World Health Organization. However, the fall proved to be short-lived, and the price began to rise again. Thus, it can be deducted from the chart that the values of BTC and ETH have had a similar development, however in the end, the growth of ETH for this timeframe was 929%, in contrast to BTC's "only" 457%. The price of LTC and XRP can be described as even more volatile than BTC and ETH, as the 3rd place changes very often. In the end, XRP won with 379% compared to LTC with 232% growth. Graph 6 shows the percentage growth of cryptocurrencies during the coronavirus crisis (from February 15, 2020, to May 2, 2021).



Graph 5: BTC, ETH, LTC, XRP percentage growth chart

Source: Yahoo!Finance

Discussion

As for the 1st model, i.e., from 2019 to 2020, the most profitable cryptocurrency was Bitcoin, with an annual growth of 62% (profit of 62.07 USD). The 2nd model, starting in 2019 and ending in 2021, shows that this timeframe was the most profitable when investing in Ethereum, with an annual growth of 1,721% (profit of 1,720.88 USD). The other cryptocurrencies mentioned (XRP and LTC) even recorded a loss in the case of the first model. In the case of LTC, it was a loss of 33% (the loss of LTC after the first year was 33.00 USD). In the case of the rainbow model, LTC's value increased by 365% (net profit would be 264.7529 USD). In the case of the last of the monitored cryptocurrencies, XRP, in the case of the first investment model, there would be a loss of 26.16% (i.e. a loss of 26.16 USD). In the case of the second model, the value of XRP increased by 515% (net profit was 415.32 USD).

The compared cryptocurrencies (BTC and ETH) have minimum in common (decentralization, blockchain, volatility), as they have both different properties and purpose. Anwar et al. (2020) compared BTC and ETH in terms of blockchain and according to their findings, the two cryptocurrencies are very similar, but upon closer examination, ETH has been found to provide greater payment efficiency and is supported by more applications than BTC. ETH also offers more advanced services such as smart contracts. Finally, Anwar et al. (2020) state that ETH provides faster payments than BTC and, last but not least, that payment with it is more secure. According to Rankhambe and Khanuj (2019), the two cryptocurrencies also differ by different programming of the blockchain. According to Sifat, Mohamad and Shariff (2019), cryptocurrencies are very similar to futures. However, cryptocurrency traders cannot profit from trading on the basis of hourly changes in their values according to movements in cryptocurrency prices, as is the case with other types of financial equivalents and derivatives.

The last of the research questions focused on the influence of COVID-19 on the development of cryptocurrency values in an effort to determine the best cryptocurrency for investment. In general, the COVID-19 pandemic affected the development of the value of all cryptocurrencies (Sahoo, 2021; Vidal-Tomás, 2021). The development of prices during pandemic was volatile, with the biggest drop occurring on March 13, 2020. The most profitable investment for this period appears to be Ethereum with 929% growth.

Abdelrhim et al. (2020) agree that Ethereum was the optimal cryptocurrency for investment during Covid pandemic. During the COVID-19 pandemic, cryptocurrencies also provided a refuge for the funds of many investors. This fact is evidenced by demonstrably higher flows of finance to cryptocurrencies (Corbet et al., 2021).

Conclusion

The aim of the paper was to find out which investment was the most profitable and also to explain the basic characteristics of the 4 cryptocurrencies examined, as well as to outline what price developments looked like during the coronavirus pandemic and explain how Bitcoin differs from Ethereum.

Bitcoin, which grew by 62%, had the most profitable investment model from 2 May 2019 to 2 May 2020. In contrast, for the second model, from 2019 to 2021, Ethereum secured the first place with a percentual two-year growth of 1,721%.

We examined the period of the coronavirus crisis from 15 February 2020 to 2 May 2021. Here, the cryptocurrency market experienced the largest fall on March 13, 2020, by approximately 50%. But the market soon recovered. The most profitable investment in this time period (approximately 15 months), was similar to the second Ethereum model with a growth of 929%.

Bitcoin and Ethereum have in common that they operate through a blockchain, are decentralized and are very volatile. Otherwise, they are practically two different things, which differ in purpose, performance, speed of transactions, mining and number of coins in circulation.

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