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MEDIA EFFECT ON CRYPTOCURRENCY POPULARITY AND PRICING

ВПЛИВ ЗМІ НА ПОПУЛЯРНІСТЬ ТА ЦІНОУТВОРЕННЯ КРИПТОВАЛЮТ

The primary intention behind this study is to assess and compare current studies, aggregate datasets and information from already existing investigations and add own datasets for explaining some effects of popularity and pricing of cryptocurrency on Bitcoin and Ethereum examples. The advantages and disadvantages of using cryptocurrency at the present stage of economic development of Ukraine are considered. The results of the research of the awareness of market participants regarding the disadvantages and advantages of cryptocurrency and the presence of interest in the usage of cryptocurrency in range period from beginning to now are given. The aim of this article is to study the possibilities of using cryptocurrency for economic development. The object of the research is the process of using cryptocurrency in the markets of Ukraine and the whole world. The results of a study of the demand for cryptocurrency in Ukraine. The research was conducted with the result of a questionnaire which were taken from previous investigation and compared with own datasets, and as a result of which it was found out: the level of awareness of cryptocurrency; subjective perception of cryptocurrency; the presence of the potential interest of Ukrainians in the acquisition of cryptocurrency; media effect on people interest; cryptocurrency pricing correlation from people interest; sources of awareness of cryptocurrency. It was found what exactly Ukrainians consider the main disadvantages and advantages of cryptocurrency. Cryptocurrency as a tool of payment and a type of electronic money is found in most countries of the world in the “grey” zone, and regulators, if not forbid, then at least do not recommend citizens to invest in such assets. However, the expertise of Ukrainian blockchain developers allows using cryptocurrency in the Ukrainian markets for the effective implementation of world experience.

Key words: blockchain, cryptocurrency, Bitcoin, Ethereum, decentralization, virtual money, mining, crypto.

Основною метою цього дослідження є оцінка та порівняння поточних досліджень, узагальнення наборів даних та інформації з уже існуючих досліджень та додавання власних наборів даних для пояснення деяких ефектів популярності та ціноутворення криптовалюти на прикладі біткойнів та ефіру. Розглянуто переваги та недоліки використання криптовалюти на сучасному етапі економічного розвитку України. Наведено результати дослідження інформованості учасників ринку щодо недоліків та переваг криптовалюти та наявності інтересу до використання криптовалюти у діапазоні від початку існування до сьогодні. Метою цієї статті є вивчення можливостей використання криптовалюти для економічного розвитку. Дослідження було проведено за результатами анкети, взятої з попереднього дослідження та порівняння з власними наборами даних, і в результаті якої було встановлено: рівень обізнаності з криптовалютою; суб’єктивне сприйняття криптовалюти; наявність потенційного інтересу українців до придбання криптовалюти; вплив засобів масової інформації на інтереси людей; співвідношення цін на криптовалюту від інтересів людей; джерела обізнаності про криптовалюту. Було виявлено, що саме українці вважають головними недоліками та перевагами криптовалюти. Криптовалюта як інструмент платежу та вид електронних грошей зустрічається в більшості країн світу в "сірій" зоні, і регулятори якщо не забороняють, то, принаймні,

не рекомендують громадянам вкладати гроші в такі активи. Натомість криптовалюта як фінансовий інструмент вже неодноразово заявляла про себе в Сполучених Штатах Америки, а саме в згадуваннях в таких великих корпораціях як PayPal, Tesla Motors, Steam. Вищезгадані компанії вже підтримують або підтримували, як метод розрахунку за послуги чи товари, криптовалюту. Свою популярність отримав не лише Bitcoin, а й такі не менш популярні як Litecoin, Bitcoin Cash, Ethereum, якщо 1 та 2 є похідними від Bitcoin, то Ethereum здобув популярність як самостійний гравець, за рахунок іншої концепції та підходів. В свою чергу досвід українських блокчейн розробників дозволяє використовувати криптовалюту на українських ринках для ефективної реалізації світового досвіду.

Ключові слова: блокчейн, криптовалюта, біткойн, ефір, децентралізація, віртуальні гроші, майнінг, крипто.

Основная цель этого исследования – оценить и сравнить текущие исследования, агрегировать наборы данных и информацию из уже существующих исследований и добавить собственные наборы данных для объяснения некоторых эффектов популярности и ценообразования криптовалюты на примере Биткойн и Эфириум. Рассмотрены преимущества и недостатки использования криптовалюты на современном этапе экономического развития Украины. Приведены результаты исследования осведомленности участников рынка о недостатках и преимуществах криптовалюты и наличии интереса к использованию криптовалюты в период от начала до настоящего времени. Цель данной статьи – изучить возможности использования криптовалюты для экономического развития. Объект исследования – процесс использования криптовалюты на рынках Украины и всего мира. Исследование проводилось на основе анкеты, взятой из предыдущего исследования и сопоставленной с собственными наборами данных, в результате чего было выяснено: уровень осведомленности о криптовалюте; субъективное восприятие криптовалюты; наличие потенциальной заинтересованности украинцев в приобретении криптовалюты; СМИ влияют на интерес людей; корреляция цен на криптовалюту от интересов людей; источники осведомленности о криптовалюте. Выяснилось, что именно украинцы считают основными недостатками и преимуществами криптовалюты. Криптовалюта как платежный инструмент и разновидность электронных денег встречается в большинстве стран мира в «серой» зоне, и регуляторы если не запрещают, то по крайней мере не рекомендуют гражданам вкладывать средства в такие активы. Однако экспертиза украинских разработчиков блокчейнов позволяет использовать криптовалюту на украинских рынках для эффективного внедрения мирового опыта.

Ключевые слова: блокчейн, криптовалюта, Биткойн, Эфир, децентрализация, виртуальные деньги, майнинг, криптовалюта.

Introduction. Cryptocurrencies have become popular because they enable efficient payment systems through a decentralised distributed ledger, which does not depend on a political process or govern- mental regulatory system. First and the most popular cryptocurrency is Bitcoin, which was invented in 2008 by an unknown person or group of people using the name Satoshi Nakamoto [1]. The currency began use in 2009 [2] when its implementation was released as open-source software. Bitcoins are created as a reward for a process known as mining. In the beginning, Bitcoin was used for only illegal deals: weapon selling, drug selling, etc. Later, this type of payment moves to the common area and people have been paying for products by Bitcoin or other cryptocurrencies.

Since 2017 cryptocurrencies are the most mentioned stuff in the information area. A lot of people have started using cryptocurrencies in the investment sphere, as for payment for products. A lot of platforms (such as Steam, Amazon, PayPal, Tesla motors) have been providing cryptocurrency payment options for users. Therefore, we need to consider the problems of implementation of various methods and tools for cryptocurrency payment options in today's stage of development of the domestic market of e-commerce systems. Thus, this problem is relevant.

Theoretical foundations of the nature of the economic and technical approaches to providing cryptocurrency payment option devoted considerable segment of modern literature, particularly such works as authors Bondarenko O., Kichuk O., Antonov A. [3], Shaen Corbet, Douglas J. Cumming, Brian M. Lucey, Maurice Peat, Samuel A. Vigne [4], Spithoven A. [5]. Among the numerous studies, within which attempts were made to determine the priority areas of development of factors, this topic became out of date, and did not receive any details according to nowadays' demand in the works of scientists. All this necessitates the detailing of knowledge and practical implementation explanation.

The purpose of the article is to analyze and generalize existing approaches to the definition of terminology, methods and cryptocurrency payment tools and explore the application of these latest tools in economic activities.

Theoretical background. Cryptocurrency ecosystems may include: the initiators, the codebase, programmers, miners, middlemen, customers, the media, and governments [5] (see Figure 1).

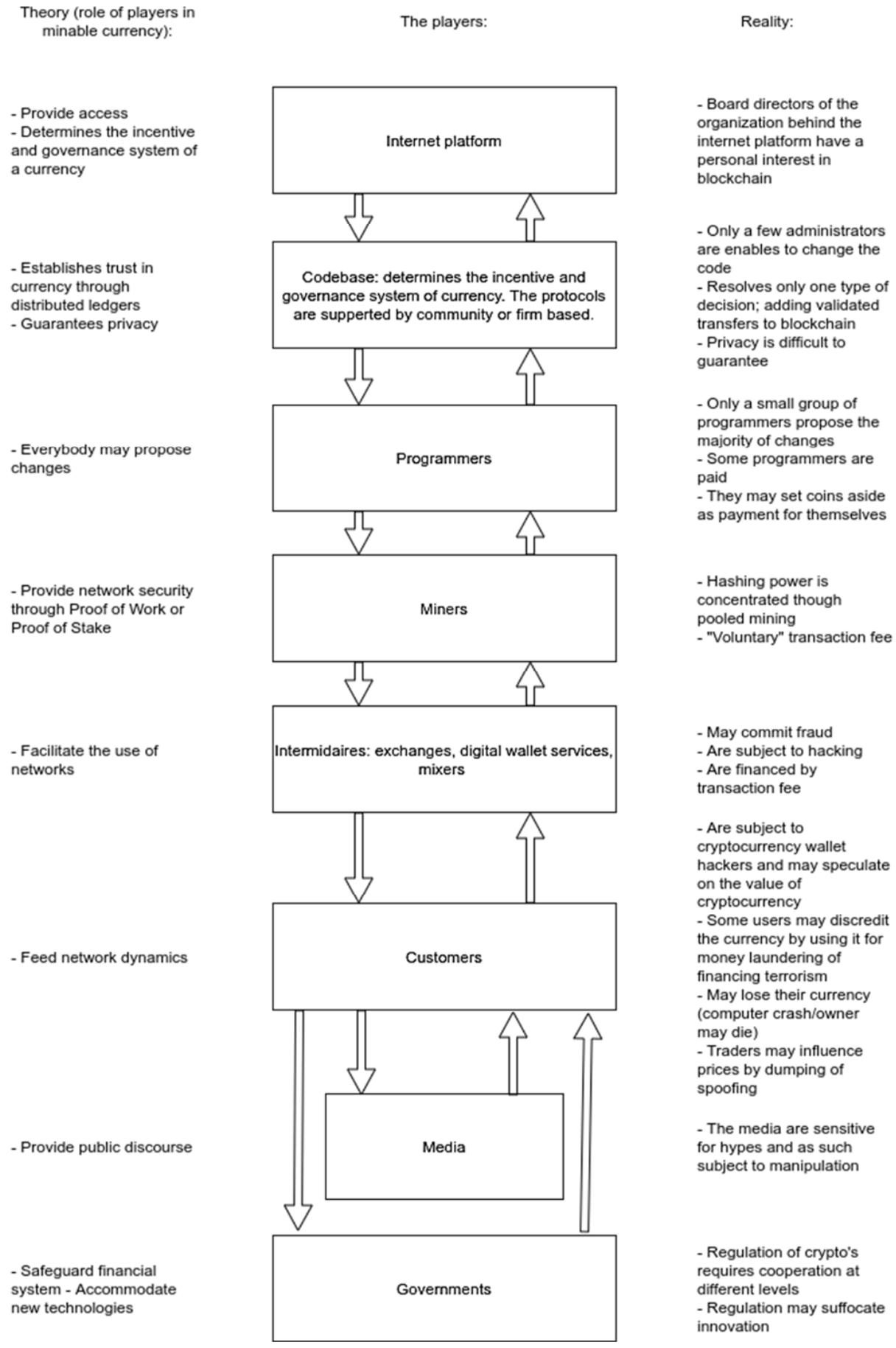

Figure 1. Cryptocurrency ecosystem schema

The sales pitch of cryptocurrency organizations is that "money supply should not be used as an instrument of monetary policy as inflation destroys value and encourages unsustainable consumption" [6]. Therefore, governments should have to become disabled to smooth business cycles and this can be achieved by setting supply at a final limit or allowing for a steady increase.

Organizations behind cryptocurrency influence their governance. For example, the Bitcoin Foundation [6; 7; 8] – whose directors have a personal interest in blockchains and other non-profit organizations coordinate efforts of cryptocurrency communities such as funding of core programmers, lobbying upon legislators to make cryptocurrency a success, and developing a platform. Values expressed by the Bitcoin Foundation concern privacy, guaranteed financial access, decentralization ("centralization of money supply leads to corruption and exploitation"), autonomy, financial inclusion, and stable money supply. Cryptocurrency internet platforms (such as bitcoin.org) are owned by the community but are likely to be influenced by sponsors (for instance, the exchange Paxful) and the website maintainer. The platforms give customers and providers of services access to public ledgers. Customers are consumers and businesses (such as, traders). Providers of processing services are programmers and validators of transactions (the so-called miners). Providers of financial services are middlemen such as wallet providers, exchange. Let's figure out what the function of each roles in this chain. The software behind the Bitcoin payment system is common. The open-source license enables everyone to propose changes to the software, while trust is assumed to be established through decentralized public ledgers in the form of a blockchain: a system to share information and to store the history of transactions on a computer network [9]. The basic code of a public ledger encloses: the rules for transactions (protocol for sending, receiving, and recording value using cryptographic methods), hash protocols (linear or tree-based protocols), block attributes (block version number, timestamp, hashes – that is, input strings of any length are transformed in output strings of a fixed length), and consensus mechanisms. To determine which blockchain is valid there are two coordination rules: first the longest blockchain is generally assumed to be reliable, and second, checkpointing – that is, a mined block must be linked (not to genesis one but) to a more recent blockchain [10]. The bitcoin programmers centrally coordinate the Bitcoin protocol [10]. They regulate the Bitcoin through their decisions regarding forking and blocking interactions from specific addresses (coin tainting) [11]. Some forks might be malicious and serve the financial interests of programmers who set aside a certain amount of coins as payment for themselves. Core programmers of the source code may benefit from volunteers by making the software available freely to everyone. Regarding Bitcoin there is a concentration of programmers who contribute to the codebase and a concentration of commenters who propose changes to the codebase [12]. It may result in different versions of the coin involved. [5]. Miners provide network security through either Proof of Work (PoW) or Proof of Stake (PoS) [9; 13]. The difference between PoW and PoS concerns who creates a new block. In a PoW system, a new block is created by the miner who is the first to solve the math problem that is involved in creating a new block. In a PoS system, the miner who has the most coins can create a new block. The PoW requires high investments (large-scale operations), is time consuming, and energy inefficient. It increases the risks of engaging in the form of mining in which payments are awarded randomly. Pools of miners emerged to diversify random payment risks [14]. Miners may join the pool and might be charged a membership fee. Some pools disclose and share transaction fees. The PoS is subject to monopolization by means of organizations with big stakes (owners of a large share in the volume of available coins). Customers feed the network dynamics. Their transactions, behaviors, and risks to which they are exposed result in adopting, rejecting, adapting, or even hard forking of cryptocurrency. Among other things, the volatility of coin value did prevent cryptocurrencies from becoming a general-purpose currency as proclaimed [15]. The value of coins fluctuates because expectations over demand are influenced by a myriad of factors. Examples of these factors are: there is no third party to intervene to stabilize the value, new cryptocurrency or disappearing cryptocurrency may influence the price of other currency, and customers of cryptocurrency are multiple in kind. Demand for a specific cryptocurrency may rise because customers may use cryptocurrency not only for lawful transactions, but also for tax evasion, money laundering, extortion, prostitution, human trafficking, speculation, and trade in drugs and weapons [16]. Other reasons that cryptocurrencies are ill-suited as a medium of exchange or as a reliable unit of account, are: transaction risks (bankruptcies of financial service providers, difficult to use), uncompetitive applications (low transaction speed, delay of verification), operational risk (operator errors, malware, security flaws, platform lock-in of programmers), privacy-related risk [14], and high

fees. Additionally, privacy is, after all, difficult to guarantee. One's identity might become revealed through one's delivery address for a purchase of a commodity [17], and through one's cryptocurrency-exchange account [18]. To stay under the radar customers may use the automatically changed wallet address after each transaction. They also may use software providing anonymity like Tor, or, in exchange of a fee, they may call in poolers of transactions [17]. The media have the power to enable public discourse, to redirect the public discussion on pros and cons of cryptocurrency, and to influence the price. Investigative journalism might provide customers and service providers with critical information regarding potentialities of new technologies, the misuse of these technologies, and existing or lacking regulations. However, (social) media are subject to hype, fake news, and news on money laundering, speculation, and manipulation by traders. This might disable their monitoring and information function. Their focus on irregularities may distract the public from potentialities of the blockchain technology [19].

Research objective and methodology. Actual, media has big role in high fame increasing of Bitcoin, as result high Bitcoin price and as result high price other popular cryptocurrencies. Cryptocurrency adherents believe that public ledgers make regulating and supervising by (extractive) agencies obsolete. Their claim is misplaced because blockchain technology concerns only registering and validation of a transaction. Participants of cryptocurrency ecosystems are unable to monitor and sanction misbehaviors. According to Sarah Gruber, "the Bitcoin ecosystem is far less trustworthy than the banks that the Bitcoin proponents denounce as untrustworthy." Cryptocurrencies and their blockchain technology have gained so much popularity that governments cannot simply forbid them. At the risk of suffocating innovation and the chance to boost innovation by legitimizing it [20], the use of cryptocurrencies and the supply of services based on cryptocurrencies should become regulated and supervised for the sake of fighting crime, protection of traditional infrastructures, and protection of consumers. Additionally, regulation and supervision are also desired to safeguard the financial system. Namely, the traditional financial system is challenged by cryptocurrency. Cryptocurrency may "transform the monetary system as a whole" [19]. In addition to regionally regulating cryptocurrencies, governments should also cooperate internationally to combat the misuse of cryptocurrency, and to protect the cryptocurrency features, because customers that transfer cryptocurrency "may fall outside the regulatory scope" of a nation's law, or because exchanges may move "to countries with less regulation." Probably governments must also prohibit mixing services and the Tor network [16]. Was figured out and explained the roles of parts in the chain of cryptocurrencies ecosystems. Let's discuss Advantages and disadvantages of cryptocurrency. The cryptocurrency inventors assert that the usage of their product is reliable and effective, as evidenced by the presence of a number of advantages, but there are also disadvantages. Some features inherent in cryptocurrency are considered ambiguous. These include decentralization and anonymity. The problem of decentralization lies in the lack of control and tracking of the release and movement of virtual money by users or government bodies since these operations are a programmed process embedded in the algorithm. Anonymity is another controversial issue, which, on the one hand, increases the attractiveness of the use of cryptocurrency by ordinary people since it is not taxed by the state, and on the other, and as it was mentioned it provides wide opportunities for the implementation of criminal activity as it was in the beginning. The analysis of disadvantages and ambiguous moments makes it clear that the other side of the coin outweighs the benefits of this currency unit because it not only provides an opportunity to simplify the conduct of financial transactions but also provokes the growth of Internet fraud. Recently, we have witnessed a sharp increase in the number of attacks on cryptocurrency using the capabilities of victims' computers for cryptocurrency mining. And alternative currencies also play an important role in extortion attacks, being the best way of payment. However, the demand for cryptocurrency necessitates the development of methods for combating cybercrime in general and crypto fraudsters in particular. Thus, researchers from the University of Cambridge are investigating methods for combating cybercrime on the basis of biometric technologies. However, there are also significant advantages to which, moreover, is added the possibility of using cryptocurrency as an investment instrument. Destroying some main features such as anonymity or decentralization can lead to decrease of popularity and usage as these are the main cryptocurrencies paradigms.

Results and discussion. However, the peak of popularity in the whole world for cryptocurrency was December of 2017 – January of 2018 and April of 2021 – May of 2021. These conclusions was made according to Figure 2 and Figure 3. These graphs show prices of Bitcoin and Ethereum (the most popular cryptocurrencies) from the beginning of existence to now (summer of 2021). Obviously

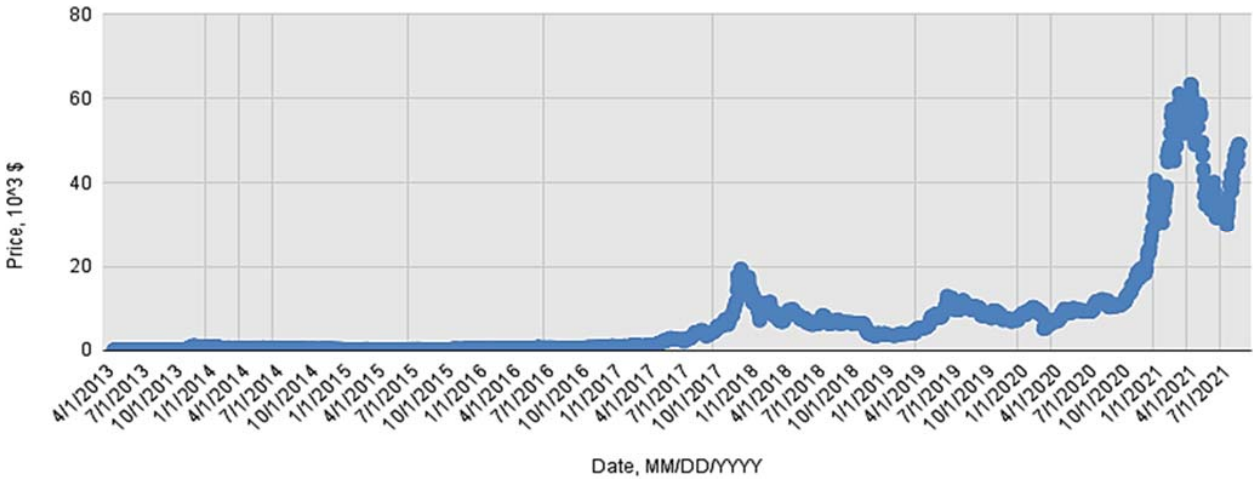

Figure 2. Trend of bitcoin price in range from 04.28.13 to 08.22.21

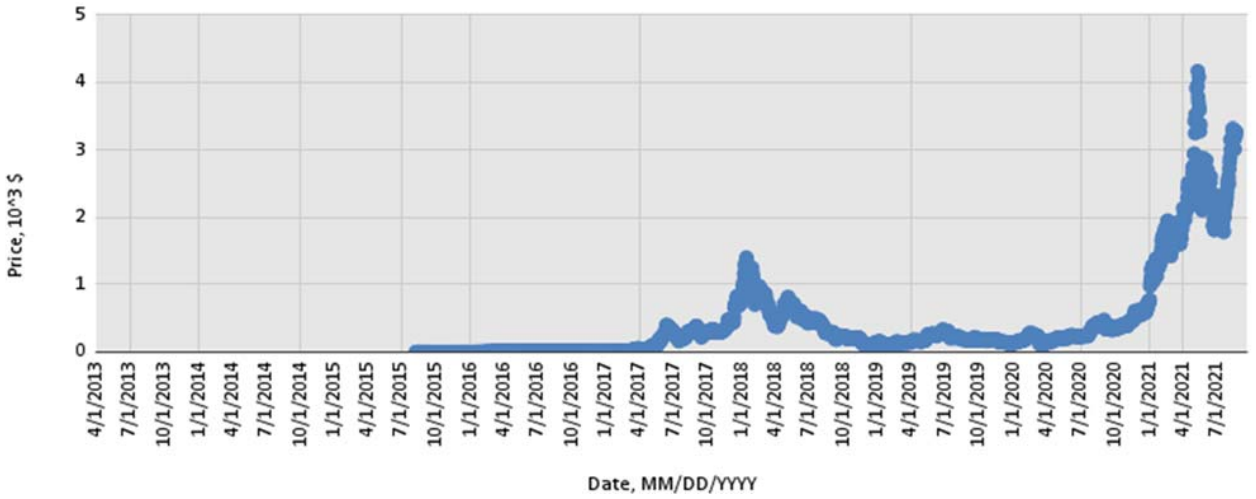

Figure 3. Trend of ethereum price in range from 04.28.13 to 08.22.21

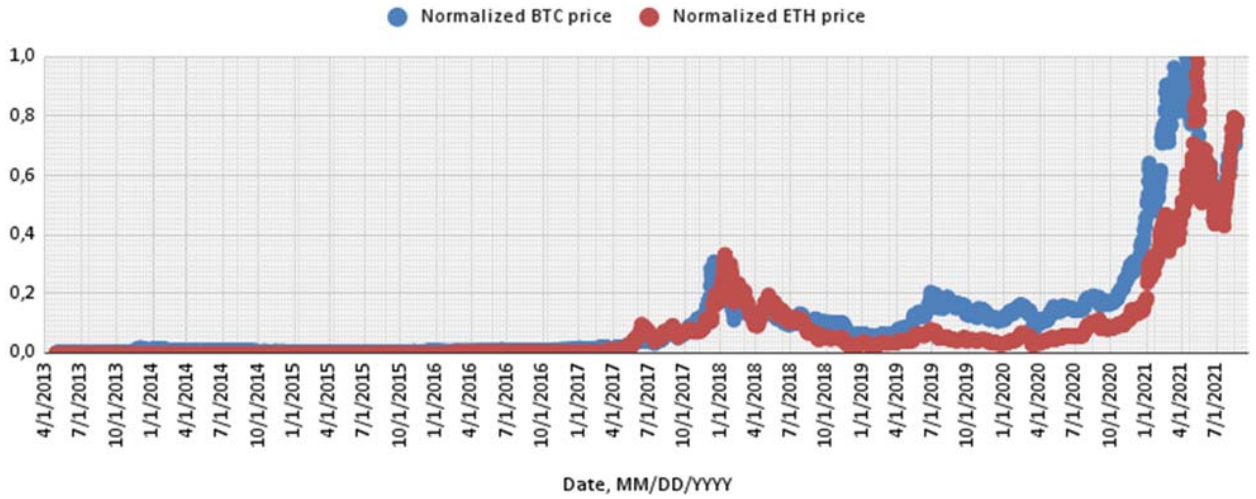

Figure 4. Qualitative analysis of price trends on bitcoin and ethereum in range from 04.28.13 to 08.22.21

it means that at this time people had more than usual interest in cryptocurrency. Let's aggregate these data to analyze cryptocurrency trend. Figure 4 is shown dependence on bitcoin and ethereum prices on date in qualitative meaning. It means that it was analyzing only curve form

instead of values. It was reached by values normalization, where each value for different curves was divided by the maximal value of each curve.

Let's figure out how media affects pricing. On Figure 5 and Figure 6 is shown google search trends for some keywords which related to cryptocurrencies during 2013–2021. Here presents a conditional scale for estimation popularity for each of the present keywords as in the whole world as in Ukraine. According to Figure 5 bitcoin is the most popular keyword from current keywords. When we compared google trends in Ukraine and in the whole world on Figure 7, here was shown that interests in Ukraine are similar to interests in the whole world.

To prove that cryptocurrencies pricing depends on people's interest let's compare let's aggregate google trends data and price trends during some period. To correctly aggregate these data, normalization must be processed as in the example before. Figure 8 is observed correlation between people's cryptocurrency interest and cryptocurrencies pricing. Where BTC_n_price and ETC_N_price are normalized prices and BTC_trend and ETC_trend are normalized google trends values.

However, let's discuss awareness of Ukrainians in cryptocurrencies. The study was conducted using the questionnaire method. Respondents were asked to fill out questionnaires in Google form, in electronic form [3]. The survey included 450 respondents aged from 17 to 70 years. Among them:

– from 17 to 25 years – 334 respondents, which amounted to 74.2%;

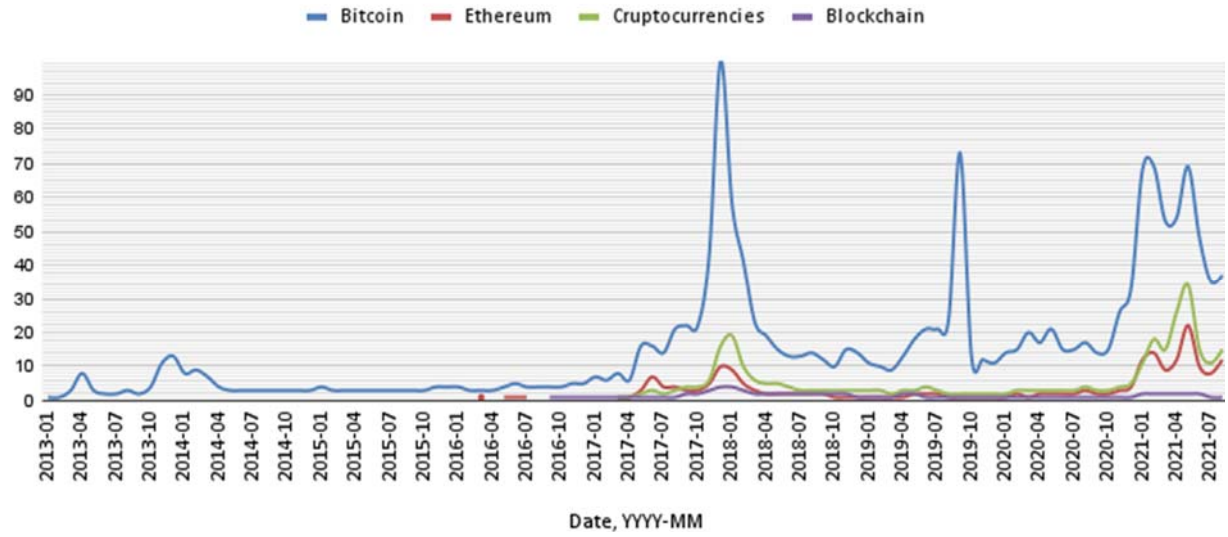

Figure 5. Google search trends of cryptocurrency keywords in range from 2013 to 2021

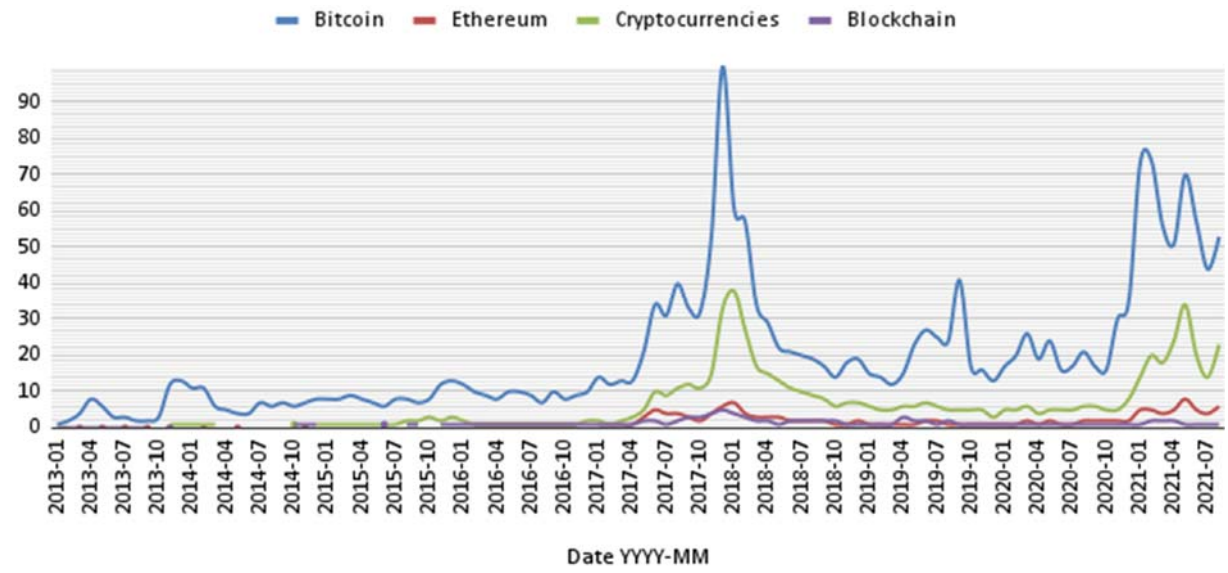

Figure 6. Ukrainian Google search trends of cryptocurrency keywords in range from 2013 to 2021

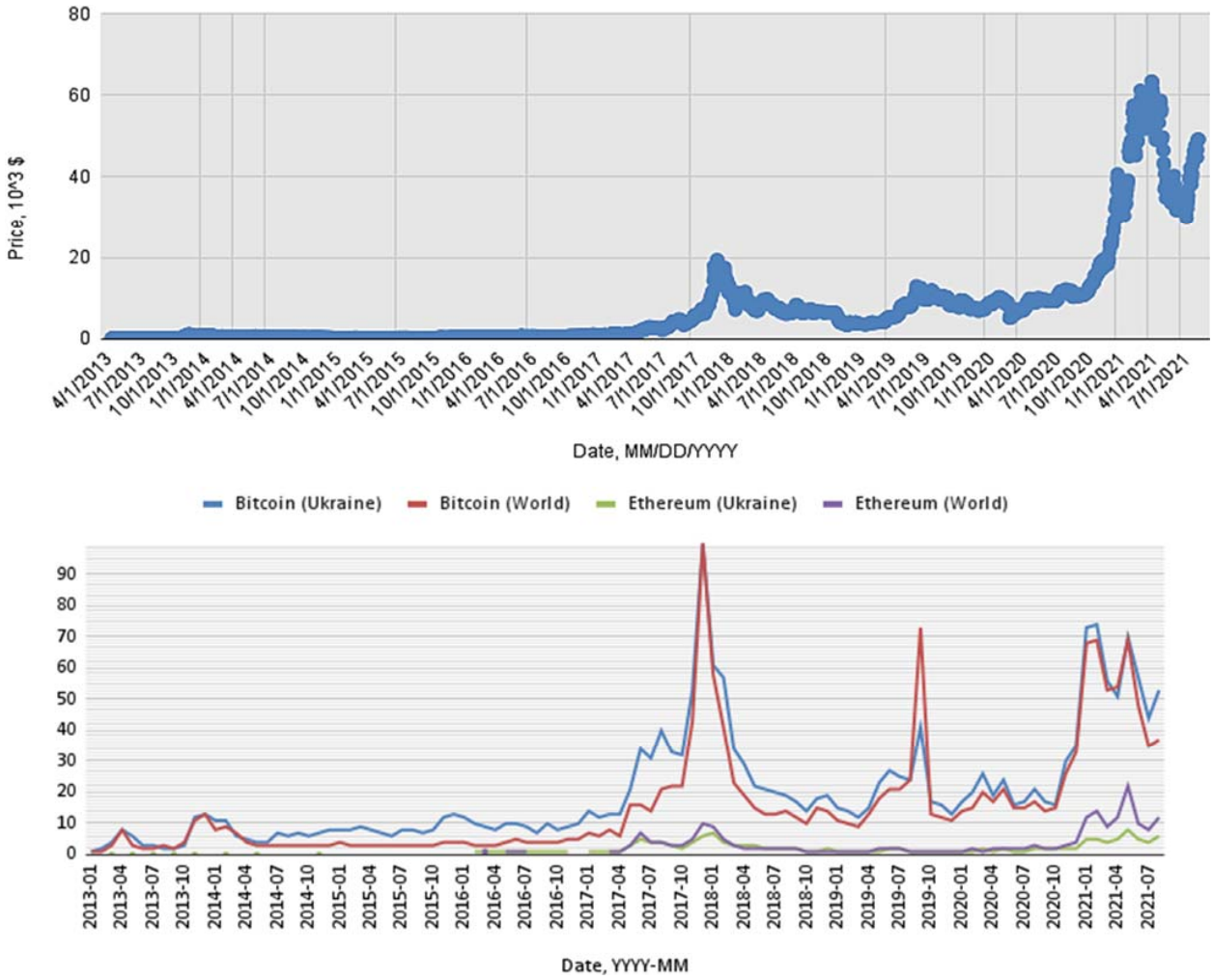

Figure 7. Comparing google search trends and ukrainian google search trends of cryptocurrency keywords in range from 2013 to 2021

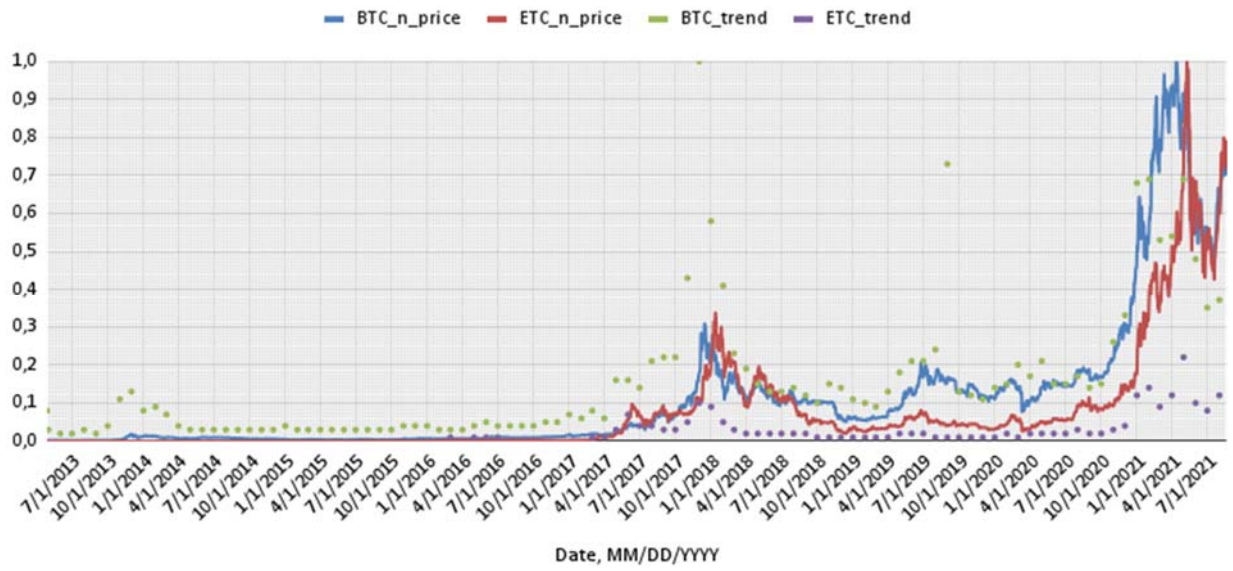

Figure 8. Aggregated pricing dependencies and trends dependencies from date in range from 2013 from 2021

– from 26 to 45 years old – 107 respondents, which amounted to 23.8%;

– from 46 to 70 years and older – 9 respondents, which amounted to 2%.

To the question "Do you know what cryptocurrency is?" 450 respondents answered that makes up 100%, 2% – 9 respondents did not answer. Of these, 441 respondents were aware of what cryptocurrency is, accounting for 98%. They did not know what cryptocurrency is – 9 respondents (2%). These respondents did not answer the questionnaire further. To the next question: "What is cryptocurrency for you?" (Figure 9), 441 respondents answered, that makes up 98%, of which 204 (45.3%) of respondents consider cryptocurrency primarily as a means of payment (money); 173 (38.4%) respondents consider cryptocurrency as a means of accumulation. In general, 48 Ukrainians surveyed (10.7%) perceive cryptocurrency as a means of speculation. Interestingly, only 16 respondents (3.6%) perceive cryptocurrency as "all of the above", as well, understand its diversity and versatility. To the question "Do you use (use) you a cryptocurrency?" 441 respondents said that makes up 98%, of which 45 Ukrainians (10%) said that they have already used or used cryptocurrency; 76 respondents (16.9%) are going to use cryptocurrency. This indicates the interest and commitment of potential cryptocurrency consumers. However, a large number, 320 respondents, accounting for 71.1%, did not use, do not use and, so far, do not plan to use cryptocurrency [3].

To the question "How did you know about cryptocurrency?" (To the question "How did you know about cryptocurrency?" (Figure 10) 441 respondents answered that makes up 98%. According to the survey, the majority of respondents, namely 186, which is 41.3%, learned about cryptocurrency in the educational institution where they study. From our point of view, these are positive trends, since it is in educational institutions that complete, comprehensive, and most importantly, high-quality knowledge is obtained. A rather large percentage of respondents – 89 (19.8%) – derive information about cryptocurrency from the media/ Internet and as much from friends. 77 respondents (17.1%) learned about cryptocurrency, purposefully pursuing their own self-development and self-education.

Conclusions. The position of the cryptocurrency in the world is ambiguous. Many large countries still recognize it, if not a means of payment, then a kind of electronic money. At the same time, many countries are in no hurry to make conclusions and want to better explore the market of cryptocurrency and the possibility of its regulation. At the same time, cryptocurrency is located in the "grey" zone in most countries of the world, and regulators, if not prohibit, at least do not recommend citizens to invest in such assets. At the same time cryptocurrency popularity doesn't reduce. Short term cryptocurrency usage reductions are possible, but at the same time can observe sharp growth. A lot of factors affect pricing and popularity, media is one of the important factors but at the same time only few persons can affect pricing, only few posts on Twitter or some news from

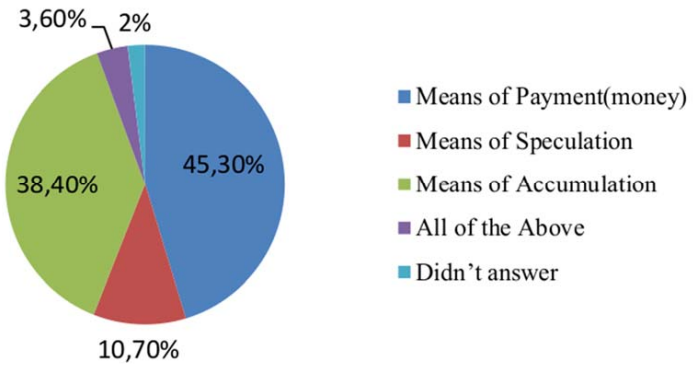

Figure 9. Diagram of questionnaire answers on question: "What is cryptocurrency for you?"

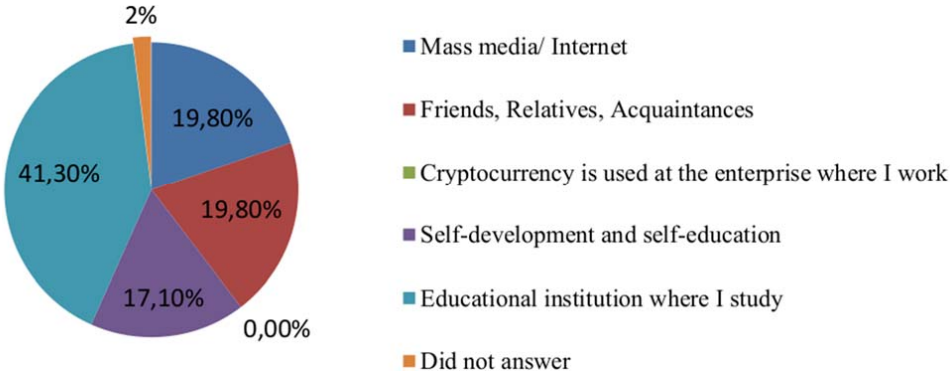

Figure 10. Diagram of questionnaire answers on question: "How did you know about cryptocurrency?"

big corporations can both reduce and increase pricing. These kinds of people or corporations are named as 'influencers'. But both pricing and people interest are cyclic dependency. When cryptocurrency prices are growing, people's interests are growing too. When people's interests are growing, cryptocurrency price of cryptocurrency is growing too. And it'll continue until people aren't ready to pay this price to cryptocurrency.

However, cryptocurrency it's not only investment stuff, it's a good, highly secure and anonymous tool to have payment deals between two or more persons without intermediaries. These characteristics attract more and more new users every day including ukrainians. Media has a big role in forming the imagination about cryptocurrency, some of them popularize cryptocurrencies, but whether or not to use cryptocurrency is a personal matter.

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