Cryptocurrency as the currency of the future: a case study among Algebra University College students

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Abstract - **The cryptocurrencies were designed to be a medium of exchange. The blockchain technology on which cryptocurrencies are based on offers many possibilities for computer science and all future businesses. For the past decade experts as well as laypeople have been experiencing cryptocurrencies in extremes. They either have a very positive attitude or a very negative attitude towards them. Experts who have very positive attitudes towards them believe that cryptocurrencies create new ways of conducting business and new ways of trust relationships are managed. Experts who have very negative attitudes towards them often emphasize the fact that they are often linked to negative connotations such as being a tool for criminal activities or skipping social responsibilities such as tax avoidance and corruption. They also emphasize the fact that it is a new, unexplored technology and an unstable market. The purpose of research conducted among students of Algebra University College was to explore their opinions and ways of using blockchain technologies in the present and their attitudes toward using cryptocurrencies in the future.**

Keywords – *cryptocurrency, blockchain technology, case study, students*

I. INTRODUCTION

Representation of the European Commission in Croatia defines Cryptocurrencies as digital money, created in digital form as a means of digital exchange. Cryptocurrencies exist only on the Internet and have not been published by, or monitored by, a central bank or government. Precisely because cryptocurrencies are not controlled by the central bank, they are not formally money [1].

They are stored in a "digital wallet" on one of the websites that provide this service. Every transaction made is recorded. The general or public "ledger" in which all transactions and value changes of cryptocurrency units are recorded is called "blockchain".

A blockchain is a database that is shared across a network of computers. Once a record has been added to the chain it is very difficult to change. To ensure all the copies of the database are the same, the network makes constant checks [2].

The blockchain offers many possibilities for computer science and all future businesses. For the past decade experts as well as laypeople have been experiencing cryptocurrencies in extremes. They either have a very positive attitude or a very negative attitude towards them.

Many kinds of research have been done, most of them showing that young people under the age of 35, mainly known as "millennials" are more prone to working with cryptocurrencies [3]. Because most researches on this topic are conducted in The United States of America, the authors of this paper decided to test this theory among students of Algebra University College.

II. ADVANTAGES OF CRYPTOCURRENCIES

Experts who have very positive attitudes towards cryptocurrencies believe that they create new ways of conducting business and new ways of how trust relationships are managed. The level of technology drives changes in the global economy and, accordingly, the emergence of virtual currencies is an important event in the world of business and finance.

The European Banking Authority has divided the benefits of using virtual currencies into two categories. Those are economic and individual benefits [4]. The economic benefits under the EBA relate to more facts. First, they relate to transaction costs. In principle transaction, costs should not exist because there are no intermediaries in the transaction. However, there are transaction costs, but they are much less compared to other forms of payment. The reason is the costs incurred in regulation, internal control, and similar. Secondly, approximately every ten minutes new blockchain entries are added. The geographic distance of the participants in the transaction does not matter. Regardless of their distance, the same timeline is required to complete the transaction. This characteristic is considered an exceptional advantage in opposition to other payment methods.

The basic individual benefit of cryptocurrencies is online transactions. The use of cryptocurrencies is beneficial to both buyer and seller. Because they are autonomous they have no issuer and no institution to control their circulation, which means the seller is granted full anonymity, which buyers mainly benefit from. A return possibility in a virtual currency transaction is not deductible. When making a payment for a selected product or we cannot get the virtual currency unit back on request. This is where the EBA highlighted the advantage by sellers because, with traditional forms of payment in the case of fraudulent defect reports, funds often would have to be refunded [5].

Except for spending money, Cryptocurrencies have been suggested to be a new and popular form of alternative investment. They hold several important advantages over traditional forms of currency such as independence, security, and price liquidity which can result in something like we experienced with Bitcoin, resulting in a massive surge of interest in cryptocurrency. Anyone who owned Bitcoin at the end of 2017 became very rich overnight. Bitcoin exploded in price, and needless to say, everyone who wasn't a part of that wanted to invest some money in case it happened again. And it did happen again in 2019 [6].

Many cryptocurrency users find it very important that it preserves their privacy. In order to be able to open an account and execute transactions through a bank, you are obliged to provide extensive personal information, but with cryptocurrency, you do not have to provide personal data and the transactions take place anonymously. Although the degree of privacy varies from cryptocurrency to cryptocurrency, most of them guarantee complete anonymity. And you can create as many account numbers or addresses as you want [7].

One of the most interesting and important features of cryptocurrencies is the blockchain technology that it's based on. Blockchain technology makes it possible to digitize every physical object or service and to put its value in the blockchain. For example, cars, houses, web page designs, domain names, etc. can be placed in the blockchain and traded via automatic smart contracts. As a result, the intervention of third parties such as banks, notaries, advisors, and accountants are no longer necessary and transactions can take place faster and cheaper. This can also apply to services such as insurance, loans, and similar. It can be used to manage your personal identity safely in the blockchain and use it, for example, to identify yourself when traveling, verifying the age when purchasing alcohol, etc. Finally, smart contracts can be used to fully automate government tasks, when collecting taxes, issuing permits, paying subsidies, and when holding local, regional, or national elections. In that way, everyone can see exactly what goes in and what comes out and the government can become a lot more transparent [8].

III. DISADVANTAGES OF CRYPTOCURRENCIES

As stated before, the advantage of cryptocurrencies is its anonymity but the downside of anonymity is its lack of confidence. The lack of a competent institution to control and guarantee creates a high risk of the counterparty. In electronic money, the issue of risk and trust is questionable, while in fiat money it is highly correlated with the national economy and politics [8].

While some experts applaud the anonymity feature of cryptocurrencies, many see them as a downside. The reason for that is their susceptibility to criminal purposes resulting from the anonymity of their use. The black market and the dark web are big users of cryptocurrencies. Criminals value their anonymity, as much as they value the ability to send vast sums of money around the world simply using their phone. This made cryptocurrencies

relatable to the risk of money laundering, terrorist organizations, and other illegal activity, financing many negative connotations [9].

From a strictly economic view, many experts show a negative attitude towards cryptocurrencies because of their strong volatility and difficulty to predict. Since the beginning, cryptocurrencies had a highly volatile nature. This is one of the main reasons mass adoption is taking longer than it should. Many corporations don't want to deal with a form of money that is going through huge swings in volatility. Even though we had a positive experience of volatility at the end of 2017., when Bitcoin exploded in price, many other cryptocurrencies in use behave the exact opposite, and lose their value fast, creating a risk for potential investments[10].

Except for volatility is the number one risk of crypto investing, experts are also pointing out other potential problems. Regulatory and legal issues are two of the big obstacles facing the crypto sector. Because the technology is new, governments and banks have not yet formed a coherent fiscal policy for them. Therefore, there is a risk that their taxation status, trading rules, or even legality, could change and become more complicated. Also, a concern, although it's never been conclusively proved, it's widely assumed that insider trading, collusion, and market manipulation is present across the crypto sector[11].

And last, but not least, one big cryptocurrency issue is lack of awareness and understanding. It is a known fact that many people are still unaware of digital currencies. To be able to use and invest in cryptocurrencies people need to be educated to be able to apply it to their lives. Businesses are accepting bitcoins because of the advantages, but the list is relatively small compared to physical currencies. One of the reasons is that the workers need to be educated on Bitcoin so that they can help the customers. This will definitely take some time and effort. Otherwise, what is the benefit of such large companies accepting Bitcoin if its staff doesn't even know what digital currencies are[12].

IV. WORLD'S LARGEST CRYPTOCURRENCY BY MARKET CAP

At the time of October 8th, 2019 there were approximately 2,957 cryptocurrencies being traded with a total market capitalization of $221bn. This means that the top 10 cryptocurrencies represent roughly 85% of the total market value. Even though the list of top 10 cryptocurrencies changes very often, the first tree on the list is a constant. Those are Bitcoin, Ethereum, and Ripple.

Being the first one to launch in 2009., **Bitcoin** is the world's largest cryptocurrency by market cap. It is created by an anonymous developer Satoshi Nakamoto, whose true identity is never verified. Bitcoin offers the promise of lower transaction fees than traditional online payment mechanisms and is operated by a decentralized authority, unlike government-issued currencies [13].

Second on the list is **Ethereum**, a blockchain-based open public network platform that enables developers to build and deploy decentralized applications for use by businesses, as well as individual users. It acts as a platform

on which a whole virtual ecosystem can be developed, stored, executed, and used by users securely and anonymously. Unlike commission-based app stores demanding a cut for hosting and running various apps, the decentralized and autonomous nature of Ethereum keeps it zero- to low-cost[14].

Third, on the list is **XRP**. XRP is a currency that is part of the Ripple technology. Ripple is a technology mostly known for its digital payment network and protocol. Ripple's main specialty is payment settlement asset exchange that is similar to the SWIFT system for international money [15].

Over the last year, fourth and fifth place of the list has been exchanged by **Bitcoin Cash** and **Bitcoin SV**. Both of those coins are a result of a hard fork of Bitcoin. A hard fork is a radical change to the protocol of a blockchain network that makes previously invalid blocks/transactions valid or vice-versa[16]. This means both of those coins started as Bitcoin, but a group of miners decided they wanted to set new rules to the code, changing its initial idea and creating their own version of Bitcoin.

Some coins that are or have been in the top 10 cryptocurrencies by market cap are Tether, Litecoin, EOS, Stellar, and Monero.

Tether is a blockchain-based cryptocurrency stable coin whose crypto coins in circulation are backed by an equivalent amount of traditional fiat currencies, like the dollar, euro, or yen. It is always worth 1 American dollar[17]. **Litecoin** is a peer-to-peer cryptocurrency. It's a fully decentralized open-source, working as a global payment network developed with the aim to improve Bitcoin's shortcomings[18]. **EOS** is a decentralized system based on the blockchain that enables the development, hosting, and execution of decentralized applications on its platform, similar to Ethereum [19]. **Stellar** is an open-source payment technology, very similar to Ripple[20]. **Monero** is a digital currency that offers a high level of anonymity for users and their transactions. It has several privacy-enhancing features that improve upon Bitcoin [21].

One crypto token that hasn't made the top 10 list yet, but created a lot of attention over the last year is the **LINK** token with the Chainlink technology behind it. ChainLink is a platform that attempts to bridge the gap between smart contracts on the blockchain and real-world applications of the blockchain. It uses oracles, which find and verify real-world data and bring it on-chain to be integrated into smart contracts [22].

V. STUDENTS AND CRYPTOCURRENCIES

A survey conducted in the United States of America in August of 2019, questioned members of Millennials to question who had some information or knowledge on cryptocurrencies. Research showed 98.4 percent of them were familiar with Bitcoin, 77.7 percent with Ethereum, 71.6 with Litecoin, and 47.6 percent with Ripple. Most surprising of all, 21 percent of the respondents did not have access to traditional banking of any kind, which makes cryptocurrency a more likely and popular alternative to traditional banking among young adults and students. The

reasons for such a huge popularity of crypto among young people are suspected to be technological advancements, and lack of faith in existing traditional banking systems [3].

VI. THE RESEARCH METHODOLOGY

A. Purpose of the Research

A survey conducted in the United States of America showed that cryptocurrencies were used at a high rate among young people (millennials). Testing that theory, the purpose of research conducted among students of Algebra University College was to explore their opinions and ways of using blockchain technologies in the present and their attitudes toward using cryptocurrencies in the future.

The research objective: *Do students from Algebra University College use cryptocurrencies?*

To answer the main research objective, the following research sub-questions were defined:

1. *Are students familiar with the concept and technology of cryptocurrency?*
2. *What characteristics of cryptocurrency do students consider to be their advantages?*
3. *What characteristics of cryptocurrency do students consider to be their disadvantages?*
4. *Do students use cryptocurrencies and / or plan to invest in them in the future?*

B. The Research Population Sample

The research was conducted among the Algebra University College students. A sample of participants was pertinent.

The total population sample was 64 participants (N = 64), which included students from 7 different study programs: Software engineering, System engineering, Digital marketing, Multimedia computing, Visual communications design, Design and communication management, and Data Science. The structure of all surveyed students according to the study program is presented in Chart 1.
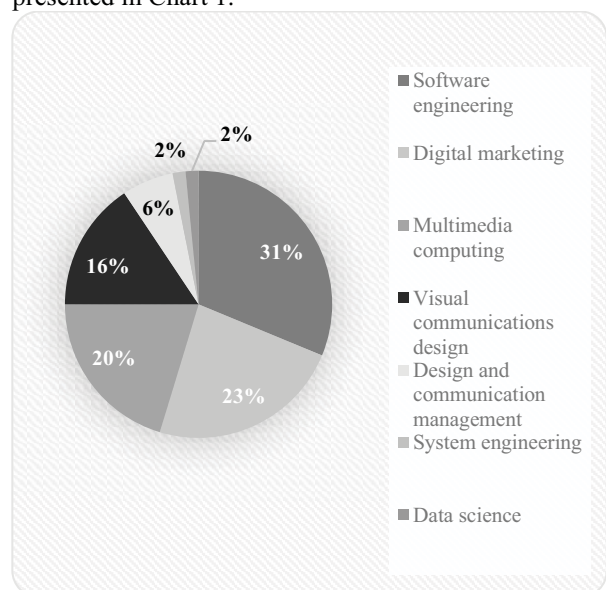

Chart 1. The structure of the participants per Study Program in percentage, N = 64.

The majority of participants were undergraduate students; 53 of them (82.8 %), while 11 (17.2 %) of participants were graduate students. 39 of students (60.9 %) were male and 25 (39.1 %) were female.

C. The Research Methods

The research was conducted through an anonymous voluntary survey during the winter semester of the 2019/2020 academic year.

A specially designed questionnaire in the Google Forms tool had 11 closed-ended questions, of which 4 were related to demographics. For 3 questions answers were defined with the degrees of frequency according to the Likert scale. 2 questions had predefined 10 statements related to the advantages and disadvantages of using cryptocurrencies. 3 questions were yes or no questions. 1 question offered the most famous cryptocurrencies for which students were able to indicate the degree of familiarity and agreement according to the Likert frequency scale.

To ensure a clear understanding of the terms, a descriptive definition of term cryptocurrency was specified at the beginning of the survey:

"A brief explanation of the terms:

Cryptocurrency is digital money, created in digital form as a means of digital exchange. It exists only on the Internet and has not been published, or monitored by, a central bank or government. Precisely because cryptocurrencies are not controlled by the central bank, they are not formally money.

They are stored in a "digital wallet" on one of the websites that provide this service. Every transaction that is made is a highly edited digital record. The general or public "ledger" in which all transactions and value changes of cryptocurrency units are recorded is called "blockchain"."

A quantitative method was used for the analysis of the research results. Through the Google Forms tool, the data processing of the survey results was made.

D. The Research Results

1. Are students familiar with the concept and technology of cryptocurrency?

The research results have shown that most of the total number of surveyed students (87.5%) are familiar with the concept of cryptocurrencies. But just over half of the students (51.6%) declared themselves familiar with the blockchain technologies on which cryptocurrencies are based on.

When it comes to particular cryptocurrencies, specifically the top 10 most valued, research results have shown that almost all of the total number of surveyed students (63) are familiar with Bitcoin. Less than half of the participants are familiar with Ethereum (28), Ripple (18) and Litecoin (17). The participants are poorly familiar with Monero (9), Chainlink (7), Tether (6), EOS (6), and Stellar (5).

The structure of student familiarity with cryptocurrencies is presented in Table 1.

CRYPTOCURRENCIES	Never	Rarely	Some-times	Often	Always
Bitcoin	0.0%	0.0%	1.6%	29.7%	68.8%
Ethereum	42.2%	3.1%	9.4%	17.2%	26.6%
Ripple	51.6%	4.7%	14.1%	15.6%	12.5%
Tether	57.8%	17.2%	12.5%	3.1%	6.6%
Litecoin	45.3%	21.9%	3.1%	10.9%	15.6%
EOS	56.3%	20.3%	9.4%	3.1%	6.6%
Stellar	60.9%	20.3%	6.6%	3.1%	4.7%
Chainlink	65.6%	17.2%	6.6%	3.1%	7.8%
Monero	62.5%	7.8%	12.5%	4.7%	9.4%

Table 1. Distribution of the students' familiarity with cryptocurrencies, N=64.

2. What characteristics of cryptocurrency do students consider to be their advantages?

In terms of advantages, 27 of the total number of students questioned has agreed that cryptocurrencies are a good investment, while 26 stayed impartial. A total of 19 students agreed that cryptocurrencies are a good way of saving (28 stayed impartial), but merely 14 agreed that cryptocurrencies are useful for protecting against the loss of value of traditional goods (27 impartial). Half of the students (32) agreed that cryptocurrencies are useful for online payments (24 impartial). Also, 28 agreed that cryptocurrencies are a safe way of paying (25 impartial). A total of 22 respondents agree that cryptocurrencies might replace money in the future (24 impartial). Half of the respondents (32) agree transaction transparency is a very important feature of cryptocurrencies (24 impartial) and 33 of them agreed that the strength of cryptocurrencies lies in the possibility to operate cryptocurrency transactions every day from 0 to 24 h, meaning that they provide better services than the banks that have this type of service limited (20 impartial). To the question of control, 27 respondents agree cryptocurrencies allow complete autonomy (25 impartial), but to the question of cost 33 neither agree nor disagree with the statement that cryptocurrencies offer lower transaction costs. And last, half of the respondents (32) agree there is a large selection of cryptocurrencies for different purposes (30 impartial).

The structure that represents the students' degree of agreement according to the Likert frequency scale is presented in Table 2.

The statements represented by letters in the table are as following:
A. *Cryptocurrencies are useful for investment purposes.*
B. *Cryptocurrencies are useful for saving purposes.*
C. *Cryptocurrencies are useful for protecting against the loss of value of traditional goods.*
D. *Cryptocurrencies are useful for buying online.*

E. Cryptocurrencies are a secure payment method.
F. Cryptocurrency will someday replace the money.
G. Transaction transparency is a very important feature of cryptocurrency.
H. It is possible to operate cryptocurrency transactions every day from 0 to 24 h, which means that they provide better services than the banks that have this type of service limited.
I. Cryptocurrencies allow us to complete autonomy.
J. The cost of cryptocurrency transactions is minimal.
K. There is a large selection of cryptocurrencies for different purposes.

STATEMENT	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
A.	4.7%	9.4%	40.6%	31.3%	10.9%
B.	9.4%	14.1%	43.8%	20.3%	9.4%
C.	6.3%	26.6%	42.1%	10.9%	10.9%
D.	3.1%	7.8%	37.5%	23.4%	26.6%
E.	6.3%	7.8%	39.1%	23.4%	20.3%
F.	6.3%	18.8%	37.5%	21.9%	12.5%
G.	3.1%	7.8%	37.5%	26.6%	23.4%
H.	6.3%	6.3%	31.3%	26.6%	25.0%
I.	3.1%	14.1%	39.1%	25.0%	17.2%
J.	4.7%	4.7%	51,6%	14.1%	23.4%
K.	1.6%	3.1%	46.9%	21.9%	25.0%

Table 2. Distribution of the agreement degree according to the Likert frequency scale.

3. What characteristics of cryptocurrency do students consider to be their disadvantages?

In terms of disadvantages, 31 of the total number of students questioned has agreed that the technology behind cryptocurrencies is new and has not yet been fully developed (22 impartial). Most of the respondents (38) agree the cryptocurrency technology is difficult for laymen to understand (20 impartial). To the question of loss, 25 of the respondents neither agree nor disagree with the statement that there is no security in case of losing funds. 35 of respondents agree that the cryptocurrency market is unregulated, and even 47 agree cryptocurrencies have not yet been accepted as a payment method in most places, of which 24 strongly agree. Students agree (29) with the statement that cryptocurrencies make it easier to evade the law, and more than half (35) agree the cryptocurrency market is volatile. Most of the respondents (24) neither agree nor disagree with the statement that the cryptocurrency market enables online theft. And at last 27 of respondents agree cryptocurrencies support unrealistic human views about easy ways of making money without effort.

The structure that represents the students' degree of disagreement according to the Likert frequency scale is presented in Table 3.
The statements represented by letters in the table are as following:
A. Cryptocurrency technology is new and has not yet been fully developed.
B. Cryptocurrency technology is difficult for laymen to understand.
C. There is no security in case of losing funds.
D. The cryptocurrency market is unregulated.
E. In most places, cryptocurrencies have not yet been accepted as a payment method.
F. Cryptocurrencies are useful for the avoidance of taxes and other government regulations.
G. Cryptocurrencies make it easier to evade the law.
H. The cryptocurrency market is volatile.
I. The cryptocurrency market enables online theft.
J. Cryptocurrencies support unrealistic human views about easy ways of making money without effort.

STATEMENT	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
A.	1.6%	14.1%	34.4%	35.9%	12.5%
B.	0.0%	7.8%	31.3%	32.8%	26.6%
C.	0.0%	7.8%	39.1%	28.3%	23.4%
D.	0.0%	7.8%	34.4%	34.4%	20.3%
E.	1,6%	1.6%	21.9%	35.9%	37.5%
F.	3.1%	1.6%	42.2%	29.7%	20.3%
G.	0.0%	1.6%	50.0%	28.1%	17.2%
H.	1.6%	4.7%	37.5%	32.8%	21.9%
I.	7.8%	12.5%	45.3%	17.2%	15.6%
J.	7.8%	7.8%	40.6%	21.9%	20.3%

Table 3. Distribution of the agreement degree according to the Likert frequency scale.

4. Do students use cryptocurrencies and / or plan to invest in them in the future?

The research results have shown that most of the total number of surveyed students (73.4 %) didn't own any kind of cryptocurrency at the moment of taking this survey and but almost half of the respondents (43.75%) answered that they will invest in cryptocurrencies in the future, of which 17.5% answered that they will surely invest. 25% of respondents answered that they probably won't invest in cryptocurrencies, of which only 6.3% answered they surely won't invest. 30.2% of respondents are not sure if they will invest.

The students' predictions on their future investing in cryptocurrencies are presented in Chart 2.
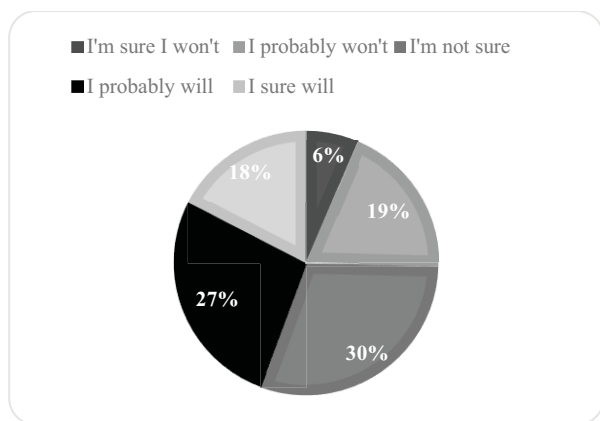
Chart 2. The structure of student's predictions in future cryptocurrency investing, N = 64.

VII. CONCLUSION

Most of the research done on young people under the age of 35, known as "millennials" has been done in the United States of America and shows that they are more prone to working with cryptocurrencies than the rest of the population. The research also shows that using cryptocurrencies is very normal for them and that most of them use it like regular payment options.

After conducting the same research in Croatia among students from one of Croatians leading IT studies, the research result shows that Croatian "millennials" are not there yet. Even though most of them are familiar with Bitcoin, only 26.6% of them own any kind of cryptocurrency. Also less than 50% of the total number of surveyed students planes to invest in it in the future as they find the technology new and hard to understand and the market unregulated and volatile.

This research was conducted before the outbreak of the Covid-19 pandemic which for Croatia escalated in the second half of March 2020. It would be interesting to repeat the research in one year to examine whether under the influence of new circumstances the students changed their opinions.

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