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Original Article

The attitude of Slovak Citizens towards Cryptocurrencies: The Gender Differences

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Abstract *- This article analyses the attitude towards cryptocurrencies in the conditions of Slovakia. The research was also aimed at the detection of gender differences within the areas of awareness, investing, mining and paying with cryptocurrencies. Data were gathered using an electronic questionnaire survey. Standard nonparametric statistical tests were used to process gathered data. The findings confirmed the existence of gender differences in attitude towards cryptocurrencies as the male respondents were more willing to use the cryptocurrencies in most of the cases. The main study limitation is the absence of the investigation of the sources of detected gender differences in the attitude towards cryptocurrencies. The paper contributes to the literature by detecting the gender differences in Slovak conditions and by the investigation of any cryptocurrency available. The main study implication is the need to improve women's digital and financial literacy to overcome the detected gender gap.*

Keywords *- Cryptocurrency, Bitcoin, Gender differences, Attitude.*

I. INTRODUCTION

In recent years, cryptocurrencies attracted a lot of attention, mainly due to enormous growths and falls in their exchange rates. Cryptocurrencies as a theoretical concept were suggested by Chaum by integrating virtual electronic money with principles of cryptography [1]. The first cryptocurrency was introduced in praxis by the person (or persons) under the pseudonym Satoshi Nakamoto in 2009 when the principle of the Bitcoin was introduced in the paper titled "Bitcoin: A Peer-to-Peer Electronic Cash System" [2]. Shortly afterwards, the first bitcoin software was released and launched the bitcoin network, and the first units of the bitcoin cryptocurrency were created.

Bitcoin is still the most popular cryptocurrency to date, even if hundreds of cryptocurrencies exist by now. Other cryptocurrencies are derived mostly from the specifications of Bitcoin or use its basic principles. The cryptocurrency can be considered as a digital medium of exchange, based on principles of cryptography, allowing to perform decentralized and distributed economic transactions between client applications via peer-to-peer computer networks [2].

The basic principle of cryptocurrency is that only a certain predefined amount of cryptocurrency is collectively produced by the entire cryptocurrency system. The rate of production is set by a predefined value and is publicly known. New units of cryptocurrency, referred to as coins, are generated by the network in the process called mining, performed by users called miners. The process of mining allows confirming waiting transactions by including them in the blockchain. Miners are dedicating their computational power to solving an artificial mathematical problem to pack the transactions into a block using very strict cryptographic rules verified by the cryptocurrency network. Cryptocurrencies use various cryptographic algorithms like proof of work mechanism during transactions confirmation. These cryptographic rules prevent previous blocks from being modified because doing so would invalidate all following blocks. Thus no individual can control what is included in the blockchain or roll back their own transactions [2].

The blockchain means a distributed decentralized database that keeps increasing the number of records, protected against unauthorized interference both from the outside and peer-to-peer network nodes. In general, the blockchain is created in several minutes, so new transactions in a given cryptocurrency are confirmed within this period. The process of mining also represents some kind of a competitive lottery that prevents any individual from easily adding new blocks consecutively in the blockchain. The process of the creation of a block uses a cryptographic algorithm. For instance, Bitcoin uses the SHA2-256 cryptographic algorithm as a proof of work mechanism [2]. Besides, some cryptocurrencies also apply a proof of stake mechanism, by which fractions of cryptocurrency units are assigned to their holders as a reward for holding the cryptocurrency (an analogy of interest).

Not all users of cryptocurrency are involved in the process of its mining. Many users use cryptocurrencies as a medium of payment or hold them as an investment in expectation of their value growth. Their cryptocurrency is stored as data in a digital wallet, which is software for the management of cryptocurrency units and their transactions. Access to a user's wallet is secured by a private key that provides very secure encryption, virtually impossible to break in a timely manner by a common

computational power. Cryptocurrencies provide a very high degree of anonymity, as long as they are pseudonymous, which allows avoidance of authorities' attention. Their anonymity makes cryptocurrencies very attractive for black economy activities, where a significant amount of transactions is transferred in cryptocurrencies. Cryptocurrencies are interchangeable for official currencies via numerous virtual markets. Reverse interchangeability from cryptocurrency to official currency is available often through the medium of the most popular cryptocurrencies (mostly Bitcoin).

Cryptocurrencies, in general, gain attention, both positive and negative, from the media and the public. Enormous price fluctuations attracted many individuals to invest in the most popular cryptocurrencies to profit from the enormous price growth. Many investment experts warn against inflating cryptocurrency price bubbles and also against investing in the initial coin offerings (ICOs) of new cryptocurrencies. Furthermore, the cryptocurrencies have the potential for price manipulations when newly introduced cryptocurrencies might be unfairly manipulated by pre-mining (i.e. massing of cryptocurrency by its creators before mining code is released to the general public).

Many national authorities worldwide often constrict the possibilities of cryptocurrency usage by laws or regulations to prevent their possible negative impacts, such as money laundering, terrorism financing, and others. Similarly, many banks often do not offer services attached to cryptocurrencies.

The variety of aspects possibly influencing the attitude towards cryptocurrencies is rather wide. Cryptocurrencies have a reputation as a technology-intensive area where high digital literacy is needed to use it. Similarly, their rapid exchange rate movements indicate that high financial literacy is required to invest in cryptocurrencies to avoid potential high losses. In the areas of digital and financial literacy, gender inequalities (with the detriment of women) have been detected for a long time [3], [4]. This digital gender gap can also be reflected in the attitude towards cryptocurrencies. It might be an interesting question, if men and women have similarly positive or negative views on cryptocurrencies, what information on cryptocurrencies do they have, how they perceive usage of cryptocurrencies for payments, investments or their mining, etc.

II. LITERATURE REVIEW

The theoretical and empirical research of cryptocurrencies often aims at Bitcoin as the most popular example of cryptocurrencies and prototype of cryptocurrency, but some studies refer to cryptocurrencies in general.

Authorities regulating the financial environment in most economies around the world (e.g. USA, China, Japan, South Korea, multiple EU member states) restrict the usage of cryptocurrencies or treat some of their aspects in a constraining way. For example, Internal Revenue Service (the government tax administration authority in the USA), for federal tax purposes, treats virtual currencies as taxable property and not a currency [5]. However, if used judiciously (and within the defined legal framework), cryptocurrencies could become a game-changer, taking Fintech to the next level in the near future [6].

Criticism of cryptocurrencies often adduces them as an unstable medium for storing the value. Unlikely fiat money, in the case of cryptocurrencies, nobody guarantees their minimal value as long as they are decentralized and independent. Although cryptocurrencies are limited in the pre-set amount of their units ever be created, what should assure their scarcity. Reference [7] investigated factors of cryptocurrency value, detecting that most of its value can be explained by the computational power, coins generated per period and algorithm used.

The growth of exchange rates of major cryptocurrencies in short periods often attracts even more potential investors, which leads to even higher fluctuations of rates. Some of the electronic commerce enterprises stopped accepting cryptocurrencies due to high volatility, even when they previously enthusiastically accepted cryptocurrency payments. Bucko et al. detected the high volatility of cryptocurrencies in comparison with traditional currencies and gold [8]. High volatility brings a high risk of devaluation of the investment but also attracts risk investors seeking potentially high yields using appropriate market timing [9]. The average monthly volatility of returns on Bitcoin was detected higher than for gold or a set of foreign currencies in dollars [10]. But on the other hand, the lowest monthly volatilities for Bitcoin are less than the highest monthly volatilities for gold and foreign currencies. The possibilities of Bitcoin usage for hedging against fluctuations of major world stock indices, bonds, commodities, and the US dollar were examined in [11] using a dynamic conditional correlation model, and the results indicated Bitcoin (due to its high volatility) as a poor hedge and suitable only for diversification purposes.

Best models for volatility estimation of Bitcoin were explored in [12], indicating the AR-CGARCH model as the best model, highlighting the significance of including both a short-run and a long-run component of the conditional variance. Reference [13] showed that returns of Bitcoin were driven primarily by Bitcoin's popularity, the sentiment expressed in newspaper reports on cryptocurrency, and the total number of transactions. The market efficiency of Bitcoin was investigated in [14], detecting significant inefficiency but maybe in the process of moving towards an efficient market. The investigation of the sources of cryptocurrencies' volatility by monitoring socio-economic signals

detected price bubbles of Bitcoin driven by word of mouth and by new Bitcoin adopters [15]. The manipulation of Bitcoin markets by suspicious trading activity was detected in [16]. It caused an unprecedented spike in exchange rates in 2013. This indicates the significance of manipulation with cryptocurrencies rates courses and another possible cause of high volatility [16].

Besides the volatility also, environmental impacts of cryptocurrencies infrastructure concern professionals. The processing power used for cryptocurrency mining is not used for any meaningful purpose, and it is generally wasted [17]. Archiving a large volume of meaningful data (e.g. data of Library of Congress estimated to 200 terabytes) in the network of a newly proposed cryptocurrency named Permacoin was suggested. The data would be decentralized and controlled by a network, whereby users would obtain corresponding permacoins for storing data. Permacoin network would serve for securing and distributing meaningful data in a decentralized system [17]. The energy consumption and thus caused air pollutant emissions by Bitcoin's implementation of proof of work (PoW) principle in times of growing interest to reduce global emissions are very questionable due to its high environmental cost [18]. Also, the energy consumption of the proof of work algorithm used by Bitcoin (estimating it in the range of 100 – 500 MW) is criticized, and less energy demanding alternative schemes are outlined [19]. Bitcoin as a digital artefact was investigated, and the conditions for its digital sustainability were proposed in [20]. The transition of the whole monetary system in Bitcoin would result in an unacceptable amount of energy consumed to mine new coins and to maintain the entire virtual monetary system, and probably Bitcoin will remain a niche currency. However, it could foster new and challenging opportunities. Sharing the framework of medical data, energy generation, and distribution in micro-grids at the citizen level, block-stack, and new state-driven cryptocurrencies may benefit from the widespread of blockchain-based transactions [21].

Other negatives of cryptocurrencies that have recently emerged are unconscious and involuntary mining using the client computer or avoidance of economic sanctions by cryptocurrencies' mining. (reportedly North Korea). Problems with crime and terrorism financing using cryptocurrencies concern authorities for a longer period. Internet black-market site (The Silk Road) used Bitcoin for payments due to its very high level of anonymity [22]. The high risk of breaching the security of cryptocurrency marketplaces is a considerable security issue [23]. An example might be the crash of Mt. Gox marketplace in 2014, the biggest Bitcoin marketplace at the time.

Several studies investigated the awareness and acceptance of cryptocurrencies. Acceptance of cryptocurrencies might be affected by its volatility, as detected in [24], who concluded that cryptocurrencies are unlikely to be widely accepted in the conditions of high volatility and absence of government support. Age, time of initial use, geographic location, mining status, engaging online discourse, and political orientation are all relevant factors that help explain various aspects of Bitcoin wealth, optimism, and attraction [25]. According to [26], the ownership of Bitcoin may be influenced by political orientation (libertarianism), level of technical skills of individuals and friendship with some Bitcoin owners. Furthermore, women were much less likely than men to have owned Bitcoin, while conscientious personality types were also less likely to be Bitcoin owners to a statistically significant degree [26]. The gender differences in awareness and usage of Bitcoin were detected in Canada [27]. Another gender gap in acceptance and usage of Bitcoin was confirmed on the US data [28]. However, such an investigation with the data from the area of Central Europe was not published to date.

Many of the mentioned aspects (legal restrictions, environmental impacts, volatility, security concerns, gender) may influence the attitude towards cryptocurrencies, and thus the attitudes of individuals towards cryptocurrencies may be very diverse. However, the aim of this paper will be an examination of gender differences in the attitude towards cryptocurrencies with a focus on selected aspects of cryptocurrencies (awareness about cryptocurrencies, their mining, usage for payments or investing). The research will not be restricted only to Bitcoin as in most articles, even though we recognize that Bitcoin is the most widespread cryptocurrency. This research will be conducted in Slovak conditions, and the difference between genders in the attitude towards cryptocurrencies will be inquired.

III. RESEARCH METHODS AND RESULTS

To investigate the attitude of respondents towards cryptocurrencies and compare them between genders, the data were gathered by an electronic questionnaire survey. The questionnaire survey can be used to gather data for an inter-gender comparison [29]. A similar method of data collection was conducted in our research to gather data suitable for our intended analysis.

Over 2100 potential respondents from Slovakia were asked to fill out electronic questionnaires. In total, 616 usable answered questionnaires were attained. The respondents were sampled using convenience sampling.

The survey also contained 18 statements related mainly to the four arching areas of cryptocurrencies: information on cryptocurrencies, payments with cryptocurrencies, mining of cryptocurrencies and investing into cryptocurrencies. The respondents expressed their rate of agreement with the statements on the 7-point Likert scale.

Gathered data were further processed and analyzed using IBM SPSS statistics software. Standard

descriptive statistic measures (mean, standard deviation, z-score) were gathered. Furthermore, the Mann-Whitney U test was conducted to detect gender differences in the self-assessment of the given statement.

Overall, 616 filled questionnaires were gathered. Only gender was investigated to detect any differences in respondents' attitudes towards cryptocurrencies. In total, 192 male and 424 female respondents answered the survey.

The awareness of cryptocurrencies was relatively very high among respondents. From a total of 616 answered questionnaires, almost 94% (578 respondents) indicated that they had already obtained any information on cryptocurrencies. The rest, 6% (38 respondents), stated the opposite. The interesting indication is that only two male respondents (approximately 1%) adduced that they had never heard about any cryptocurrency. In contrast to this finding, up to 36 females (around 8.5%) had no information about any cryptocurrency to date. In general, this finding suggests a difference in the awareness between genders already. Taking into account the needs of the survey and the construction of further questions, these respondents were removed from the sample for further investigation, and only respondents (190 males and 388 females) with any information on cryptocurrencies were considered relevant.

The survey participants further indicated the time period of the first mention of cryptocurrencies they captured. Most of the respondents (62.63%) heard about them for the first time during the period from 2015 to 2017, when cryptocurrencies got the most attention in media. The second biggest group of respondents (21.63%) registered cryptocurrencies for the first time in the period of years from 2012 to 2014. This was the period of the first growth and price bubbles of cryptocurrencies. During years from 2009 to 2011, over 5% of respondents noted the first information on cryptocurrencies. In this time period, the first cryptocurrencies emerged. Over 10.7% of respondents heard about cryptocurrencies for the first time in the year 2018 or later. Just below 53% of relevant respondents personally know someone who owns any amount of cryptocurrency.

As the source of information (acquired by our respondents) on cryptocurrencies was indicated internet and social media by 68.5% of respondents. Many respondents (52.4%) got information on cryptocurrencies also from friends and acquaintances. Television or radio was a source of information on cryptocurrencies for 13.3% of respondents and newspapers and journals for 6.6% of respondents.

Further, the popularity of individual cryptocurrencies among our respondents was investigated, as respondents indicated all cryptocurrencies they know. The most popular cryptocurrency was Bitcoin, indicated by 99.6% of relevant respondents as a familiar cryptocurrency, followed by Ethereum and Litecoin, both adduced by 33% of respondents. Ripple is known by almost 19% of respondents. Dash was adduced by almost 8%. Monero and NEO are both familiar to 6.4%, followed by Zcash (5.7%) and Byteball Bytes (3.6%) and Zclassic (2.6%). The last familiar cryptocurrency adduced by respondents in our sample was Dogecoin, known to 0.5% of them.

The investigation of the practical experience of our respondents with cryptocurrencies followed. Over 88% of relevant respondents never bought any amount of any cryptocurrency ever before. Almost 6% bought some cryptocurrency only once, over 3% bought it twice or three times and the same percentage more than three times. The mining of cryptocurrency tried almost 8.5% (49 respondents). Any payment using cryptocurrency was not conducted by almost 95% of respondents. Over 2.7% of respondents tried the payment using some cryptocurrency just once, less than 1% two or three times and 1.5% for more than 3 times. These results show that the practical experience of our respondents with cryptocurrencies is at a low level.

A substantial part of our survey created a self-assessed rate of agreement with 18 statements related to the cryptocurrencies provided by respondents. The rate of agreement was expressed by respondents on the 7-point Likert scale. Therefore, the mean of a sample at a level over 4 would indicate an agreement with the statement, and on the contrary, the values of the mean below 4 show disagreement with the given statement.

When comparing the tendencies of two groups of respondents with the central tendency on the Likert scale, it is possible to use the mean to illustrate the difference between those groups [30]. Mann-Whitney U test is a nonparametric method used to perform a hypothesis test [31]. In this case, the Mann-Whitney U test was used to detect the differences between genders in the self-assessment of agreement with the given statement. The effect size of gender explaining the variance in the self-assessment of agreement with the given statement is represented by the coefficient of determination (r squared). Our results in TABLE II with significance values below 0.05 are statistically significant at the level of α=0.05. It means there is a statistically significant difference between males' and females' rates of agreement with the particular statement. Therefore, hypothesis H0 is rejected with a probability of 95%. All results with significance values below 0.01 are statistically significant at a level of α=0.01, meaning there is a statistically significant difference between males' and females' rates of agreement with the particular statement and the hypothesis H0 is rejected with the probability of 99% [31].

Following TABLE I illustrates the percentages of answers on the 7-point Likert scale in general before separating both genders into the groups. Respondents were further divided into two groups according to

gender to compare their attitudes towards cryptocurrencies. TABLE II provides results indicating significant differences between genders in 15 from a total of 18 statements. In general, male respondents were more eager to use cryptocurrencies and more optimistic about their future.

Table 1.Percentage of Respondents' Answers on the 7-Point Likert Scale

Statement	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I have enough information on cryptocurrencies.	16.44	23.53	18.69	20.93	13.32	4.33	2.77
Information on cryptocurrencies I have is rather positive.	3.81	7.96	24.22	37.02	18.69	7.09	1.21
I am familiar with the principles of cryptocurrencies functioning in general.	11.76	21.45	19.03	19.55	16.09	8.82	3.29
I know how to acquire cryptocurrencies.	13.32	15.40	14.01	17.47	17.13	11.94	10.73
If I had the opportunity, I would use cryptocurrency for payment.	18.34	19.55	19.20	17.99	15.05	4.84	5.02
If I had the opportunity, I would mine a cryptocurrency.	16.78	15.92	12.63	18.17	16.44	9.34	10.73
If I had the opportunity, I would invest my funds into cryptocurrencies	15.57	17.13	17.47	19.38	17.65	7.44	5.36
I consider cryptocurrency rates to be very volatile.	3.81	3.98	6.23	15.92	14.53	24.91	30.62
I consider the use of cryptocurrencies for payments to be a good idea.	11.07	17.82	22.32	23.70	15.22	6.23	3.63
I consider investing in cryptocurrencies to be a good idea.	8.82	16.78	17.13	24.22	20.59	8.13	4.33
I consider the mining of cryptocurrencies to be a good idea.	9.34	15.40	16.09	27.16	17.13	8.82	6.06
I plan to pay using cryptocurrencies in the future.	28.20	26.12	13.15	20.93	7.09	2.60	1.90
I plan to invest in cryptocurrencies in the future.	23.70	22.49	12.28	19.72	12.46	6.23	3.11
I plan to mine cryptocurrencies in the future.	30.62	26.47	11.94	19.38	7.61	2.60	1.38
I would use cryptocurrencies because of their anonymity.	17.13	13.49	15.40	22.84	15.74	7.79	7.61
I would use cryptocurrencies because of their borderless character.	14.36	10.03	13.32	21.11	19.90	12.63	8.65
I think cryptocurrencies will be used more in the future.	3.81	7.44	12.46	20.24	21.45	23.70	10.90
I think that cryptocurrency rates will grow in the future.	5.54	11.42	15.05	34.43	17.82	9.34	6.40

Source: Own elaboration of data gathered

Table 2. Results of the Gender Comparison in Self-Assessment Agreement with Statements

Statement	Mean	Std. Dev.	Mann-Whitney U	Wilcoxon W	Z	Sig.	Males Mean	Females Mean	r	r^2
I have enough information on cryptocurrencies.	3.15	1.56	21914.50	97380.50	-8.07	0.00**	3.92	2.78	-0.34	0.11
Information on cryptocurrencies I have is rather positive.	3.85	1.22	36522.50	111988.50	-0.19	0.85	3.88	3.84	-0.01	0.00
I am familiar with the principles of cryptocurrencies functioning in general.	3.47	1.62	23802.50	99268.50	-7.03	0.00**	4.17	3.13	-0.29	0.09
I know how to acquire cryptocurrencies.	3.88	1.88	20949.50	96415.50	-8.53	0.00**	4.85	3.41	-0.35	0.13
If I had the opportunity, I would use payment in cryptocurrency.	3.26	1.70	31137.00	106603.00	-3.08	0.00**	3.62	3.09	-0.13	0.02
If I had the opportunity, I would mine a cryptocurrency.	3.72	1.92	27036.00	102502.00	-5.27	0.00**	4.34	3.42	-0.22	0.05
If I had the opportunity, I would invest my funds into cryptocurrencies	3.50	1.72	30968.50	106434.50	-3.17	0.00**	3.85	3.33	-0.13	0.02
I consider cryptocurrency rates to be very volatile.	5.30	1.66	22627.50	98093.50	-7.75	0.00**	6.01	4.95	-0.32	0.10
I consider the use of cryptocurrencies for payments to be a good idea.	3.47	1.55	30527.00	105993.00	-3.42	0.00**	3.81	3.31	-0.14	0.02
I consider investing in cryptocurrencies to be a good idea.	3.72	1.58	32959.50	108425.50	-2.10	0.04*	3.93	3.63	-0.09	0.01
I consider the mining of cryptocurrencies to be a good idea.	3.78	1.62	29505.00	104971.00	-3.97	0.00**	4.17	3.59	-0.17	0.03
I plan to pay using cryptocurrencies in the future.	2.69	1.53	30176.00	105642.00	-3.64	0.00**	3.07	2.51	-0.15	0.02

I plan to invest in cryptocurrencies in the future.	3.07	1.72	27691.50	103157.50	-4.95	0.00**	3.62	2.80	-0.21	0.04
I plan to mine cryptocurrencies in the future.	2.61	1.52	33638.50	109104.50	-1.76	0.08	2.82	2.51	-0.07	0.01
I would use cryptocurrencies because of their anonymity.	3.63	1.80	30314.50	105780.50	-3.52	0.00**	4.02	3.44	-0.15	0.02
I would use cryptocurrencies because of their borderless character.	3.95	1.82	30202.00	105668.00	-3.58	0.00**	4.31	3.77	-0.15	0.02
I think cryptocurrencies will be used more in the future.	4.63	1.59	33033.00	108499.00	-2.07	0.04*	4.76	4.57	-0.09	0.01
I think that cryptocurrency rates will grow in the future.	4.02	1.50	34609.50	110075.50	-1.23	0.22	4.14	3.96	-0.05	0.00

*Source: Own elaboration of data gathered, (*statistically significant at α=0.05, **statistically significant at α=0.01)*

Our respondents did not indicate having enough information on the cryptocurrencies in general (sample mean at M=3.15). However, male respondents claimed that they have enough information on crypto currencies (with a mean M=3.92) more frequently on average than females (M=2.78). The difference between self-assessment of our respondents at this statement is statistically significant at the level of 0.01 (p-value<0.01), and gender explains 11% of the variance (r^2=0.11) in self-assessment of having enough information on the cryptocurrencies.

Both genders were assessed having rather positive information on cryptocurrencies (M=3.85) at around the same rate (males at 3.88 and females at 3.84). The difference in self-assessment, in this case, was not statistically significant (p=0.85). It can be interpreted that both genders indicated having on average negative or neutral information on cryptocurrencies.

In general, respondents in our sample do not agree that they are familiar with the basic principles of cryptocurrencies (M=3.47). In this statement, men (M=4.17) self-assessed their knowledge significantly (p<0.001) more positive than women (M=3.13) and gender explained 8.6% (r^2=0.086) in a variance of self-assessment in this statement.

Regarding the respondents' knowledge of options for acquiring crypto currencies, the answers were mainly neutral (M=3.88). Males' self-assessment in the case of this research statement was significantly (p<0.001) more positive (M=4.85) than in a group of female respondents (M=3.41). The gender explains 12.6% of the variance in the self-assessment (r^2=0.126) of the knowledge on how to acquire cryptocurrencies.

Our respondents, on average (M=3.26), would not use crypto currencies for payment. Again, males were more eager to use crypto currencies for payments (M=3.62) than females (M=3.09). This difference was detected significant (p=0.002) and gender explains approximately 1,6% (r^2=0.016) of variance in self-assessment here.

Furthermore, respondents answered the question of whether they would mine the cryptocurrencies. Their attitude towards mining by assessing their agreement was rather negative (M=3.72) or neutral, but men (M=4.34) were significantly (p<0.001) more willing to mine the crypto currencies if they had the opportunity than women (M=3.42). The gender explains 5% of the variance in the self-assessment (r^2=0.05) of the knowledge on how to acquire cryptocurrencies.

Respondents in our sample would not invest their funds into cryptocurrencies on average (M=3.50). Male respondents were significantly (p<0.01) more positive (M=3.85) in their self-assessed inclination to invest their funds into the cryptocurrencies than females (M=3.33). The gander explained 2% of the variance in respondents' self-assessment r^2=0.02).

Most of the respondents think that cryptocurrencies, in general, are very volatile (M=5.30). The interesting result is that the male respondents (M=6.01) consider cryptocurrencies to be volatile in a significantly ($p<0.001$) higher degree than females (M=4.95); nevertheless, they are more positive in their attitude towards crypto currencies. In this statement, gender explains 10% of the variance ($r^2=0.10$) in the attitude of respondents.

The respondents rather disagree (M=3.47) with the statement that payments using cryptocurrencies is a good idea. Again, males are significantly ($p<0.001$) less negative (M=3.81) in their self-assessment of this statement than females (M=3.31). The gender explained around 2% of the variance ($r^2=0.02$) in the position of respondents on this statement.

Our respondents were slightly negative (M=3.72) when assessing investing in crypto currencies to be a good idea. Men assessed the statement as almost neutral (M=3.93), while women were significantly ($p<0.05$) more negative (M=3.63) in the assessment. In this case, gender explained 1% of the variance ($r^2=0.01$).

The respondents in our sample were slightly negative (M=3.78) also when assessing the mining of cryptocurrencies. Male respondents were significantly ($p<0.001$) more positive (M=4.17) than women (M=3.59) when considering the mining of the cryptocurrencies to be a good idea, and the gender of respondents explained approximately 3% of the variance ($r^2=0.03$) in assessing this statement.

Most of our respondents (M=2.69) do not plan to pay using any cryptocurrency. Males were again significantly ($p<0.001$) less negative (M=3.07) in self-assessing the agreement with this statement than women (M=2.51). 2% of the variance ($r^2=0.02$) in the assessment of this statement was explained by gender.

Similarly, the answers were negative (M=3.07) when assessing the respondents' plans to invest in cryptocurrencies. Men were significantly ($p<0.001$) less negative (M=3.62) in this case than women (M=2.80). The gender explained around 4% of the variance ($r^2=0.04$) in the self-assessing of respondents' attitude on this statement.

Our respondents indicated that they do not plan (M=2.61) to mine cryptocurrencies. Both genders adduced disagreement with the statement at a similar rate (males M=2.82 and females M=2.51). The difference in self-assessment, in this case, was not statistically significant ($p=0.08$).

The respondents, in general, do not agree (M=3.63) with the statement that they would use cryptocurrencies because of their anonymity. The answers of male respondents were neutral (M=4.02), while the females answered rather negative (M=3.44). The difference between genders was significant ($p<0.001$), and gender explained approximately 2% of the variance ($r^2=0.02$).

The self-assessed agreement with the statement that respondents would use cryptocurrencies because of their borderless character was neutral (M=3.95). Again, males were significantly ($p<0.001$) more positive (M=4.31) than women (M=3.77). The gender explained around 2% of the variance in self-assessment in this case.

Our respondents, on average, indicated that they think that cryptocurrencies will be used more in the future (M=4.63). Answers of men were slightly more positive (M=4.76) than answers of women (M=4.57), and this difference was significant ($p<0.05$). The gender explained 1% of the variance in this statement assessment.

The agreement of respondents in our sample with the statement that rates of cryptocurrencies will grow in the future was neutral (M=4.02). The difference between the genders in self-assessment, in this case, was not statistically significant ($p=0.22$). The respondents are uncertain about the future development of cryptocurrency rates.

Our results indicate significant gender differences basically in all general aspects of cryptocurrencies (awareness, mining, payments, investing) investigated by the survey. This is in accord with the results acquired in the USA [28] and in Canada [27].

IV. CONCLUSION

This contribution investigated gender differences in attitude towards cryptocurrencies in the conditions of Slovakia. The main findings were the neutral or slightly negative attitude towards cryptocurrencies and significantly more positive attitude of male respondents towards cryptocurrencies than of female respondents. Only three statements (from 18 included in the survey) about the attitude towards cryptocurrencies were not detected gender differences.

In all the other 15 statements were statistically significant differences between genders, in all cases with a more positive attitude of males. In all other research statements were answers of men more positive than women. The biggest difference was in the case of self-assessed knowledge of ways of acquiring crypto currencies. This suggests that male respondents are inclined to assess cryptocurrencies more positively. Our results confirm the findings acquired in other countries, e.g. detecting significantly higher awareness of Bitcoin among males than females in conditions of Canada [27].

Our research did not aim to examine the determinants of differences in the attitude towards cryptocurrencies in Slovakia. The gender gap in Bitcoin literacy was detected and investigated in [28], suggesting that the lower financial literacy of women explains the major portion of this gap. Socio-demographics and personality traits explained only a small share of the gap [28].

Digital skills gaps between genders in EU countries were identified in [32], especially in the area of more complex IT skills (where usage of

cryptocurrency might be included). It can be assumed that also this gender difference in digital literacy might be partially causing the gap in the attitude towards cryptocurrency. However, investigation of gender differences in digital skills causing differences in attitude towards cryptocurrencies might be a basis for future extension of our research.

The need to improve women's financial and digital literacy is the main implication for praxis. However, this improvement must be made through long term education and encouragement of women in the areas of ICT and economics. This implication, therefore, should affect mainly authorities, policymakers, governments, non-profit organizations, and educational institutions.

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