A comparative study of Romanian students' perceptions on cryptocurrencies before and after the 2022 cryptocurrency market cap collapse

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Abstract

Since the year of 2022 was marked by many significant and rapid changes on the cryptocurrencies market, this comparative study explores perceptions of Romanian students about cryptocurrencies before and after the market collapse. A qualitative approach has been used to understand attitudes towards cryptocurrencies in March 2022 (when prices of most cryptocurrencies were higher) and then the same study was conducted during August-November 2022 (when the prices of most cryptocurrencies were lower after a dropout in prices that lasted all throughout the summer). Descriptive and inferential statistics were used to compare the results. Our findings show that cryptocurrencies were associated with more negative words in the second wave of the study, but surprisingly, the willingness to invest in such assets did not change that much. However, the willingness to invest seemed to be influenced by how secure/trustworthy respondents perceived cryptocurrencies. Implications and future research suggestions are finally discussed.

Keywords: cryptocurrencies, cryptocurrency market, perceptions on cryptocurrencies, cryptocurrencies associations, willingness to invest

Introduction

As most innovations require time to be assimilated (Hairudin *et al.*, 2022) and do not happen without controversy (Treiblmaier and Gorbunov, 2022), cryptocurrencies are not an exception. Therefore, there is still a debate on whether they provide more advantages or disadvantages to companies, consumers and the society and economy in general (Knežević *et al.*, 2020). Currently, regarding this debate, attitudes started to be even more "in extremes", due to multiple events and rapid changes happening on the cryptocurrency market. For example, at the end of 2021, Bitcoin had reached its maximum of $68.000 in November 2021, but dropped to approximately $35.000 in

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January 2022. However, in March 2022, it started to rise again and almost reached $50.000 (DeMatteo, 2020). Quickly after that, a dropout that lasted all throughout the summer made Bitcoin value around $20.000 in September, with its value going even lower in November, making Bitcoin around $16.000, which is actually the value by which this digital currency started the year 2023. Such massive changes in the market have been discussed on the news and social media. Social networks were proven in multiple studies to influence sentiments towards investment markets (in general and cryptocurrency market) (Kyriazis *et al.*, 2022; Reis and Pinho, 2021; Gurdgiev and O'Loughlin, 2020), values and prices of different cryptocurrencies (Ortu *et al.*, 2022; Pongodi *et al.*, 2021; Mai *et al.*, 2018), the trading volume (Ante, 2023) and opinions about cryptocurrencies (Alghobiri, 2019). The same stands for news about cryptocurrencies, which were found to influence cryptocurrencies returns and volume (Rogone *et al.*, 2020) and sentiments towards these assets (Yao *et al.*, 2019). Taking this into consideration, the idea that this study had as a starting point was the fact that all the massive changes on the cryptocurrency market that happened during 2022 and which were popularized on social media and on the news could have influenced people's perceptions of cryptocurrencies. This aspect was also supported by the article of Treiblmaier and Gorbunov (2022) who proved that information people are exposed to plays an essential role in shaping attitudes towards new technologies. In their study, people exposed to positively-skewed information about cryptocurrencies manifested a more positive attitude towards cryptocurrencies' trustworthiness and risk than those exposed to negatively-skewed information. From a marketing perspective, this finding is an important one in regard to how consumers' attitudes towards cryptocurrencies can be influenced. However, the study of Treiblmaier and Gorbunov was a case-control study, measuring different quantitative variables like trust, security, perceived risk and privacy of cryptocurrencies for two controlled groups (one being exposed to positive information about cryptocurrencies and the other one being exposed to negative one). Taking this into consideration, we wanted to add to the scientific literature a qualitative study, aiming to explore people's perceptions about cryptocurrencies and how they change not in a controlled environment, but without the researchers interfering with the respondents, over a long period of time marked by many important events on the market. To do so, we have chosen two different contexts: a more 'optimistic' context, when events on the cryptocurrency market seemed to be promising, with prices rising in general, and a more 'pessimistic' context, characterized by price dropouts. Hence, we conducted a first study regarding Romanian students' perception of cryptocurrencies in March 2022 (when there was an overall optimistic attitude towards the cryptocurrency market and Bitcoin was around $50.000) (Faraonel *et al.*, 2022). The same study was then conducted during August-November 2022, when prices of multiple

cryptocurrencies were down (and Bitcoin was around $20.000, decreasing to $16.000 at the beginning of November). The results of the two studies aimed to help us explore perceptions about cryptocurrencies in a bull market (i.e. a market characterized by cryptocurrency-price rising – Zhang *et al.*, 2020) VS perceptions about cryptocurrencies in a bear market (i.e. market characterized by cryptocurrency-price falling – Zhang *et al.*, 2020). Thus, the main objectives of our study were:

O1. To identify differences in respondents' perceptions of cryptocurrency from March 2022 compared to August-November 2022.

O2. To identify the current willingness to invest in cryptocurrencies given the circumstances of the cryptocurrencies market.

O2a. To identify the main reasons for the current willingness to invest of respondents.

O3. To identify the main media outlets utilized by respondents as sources of information pertaining to cryptocurrencies.

Here, it must be mentioned that even if there was no interfering with our subjects, attitudes towards cryptocurrencies could have also been influenced by other factors like the knowledge people have about the technology behind this phenomenon, previous experiences with cryptocurrencies and perceptions of the expected benefits, as the literature notes (Breward *et al.*, 2017). However, taking into consideration the complexity of blockchain technology that cryptocurrencies are based on, with just a few people being completely aware of how this technology works, the other ones have to rely on information provided by companies (Treiblmaier and Gorbunov, 2022) and/or other sources like media, social media, influencers and even individuals to shape their perception about cryptocurrencies (Ante, 2023; Alaklabi and Kang, 2021; Breidbach and Tana, 2021). Thus, it seems obvious that events happening on the market which were intensively popularized have influenced people's perception of cryptocurrencies. Hereby, the next section will briefly summarize the extant literature regarding cryptocurrencies and more specifically, perceptions of cryptocurrencies and attitudes towards them. We then present our methodology and our findings. For the findings section, our results will be compared with the findings of the first study (Faraonel *et al.*, 2022), so we can discuss after that if and how subjects' perceptions have changed. Finally, conclusions, limitations and future research directions are discussed.

1. Literature Review

In 2008, a whitepaper entitled "Bitcoin: A Peer-to-Peer Electronic Cash System" was published and authored under the pseudonym Satoshi Nakamoto (Nakamoto, 2008). This document outlined a

revolutionary concept for facilitating digital transactions without the need for intermediaries, such as traditional financial institutions. The article proposed a system which would utilize cryptography to ensure security instead of relying on centralized entities, such as central banks, law enforcement, or anti-counterfeiting measures. This is what Bitcoin and other cryptocurrencies possess as specific fundamental characteristics: decentralization, pseudo-anonymity, and transparency, which are integral to their underlying structure and operation. (Narayanan *et al.*, 2016). Hence, by all these innovations, the cryptocurrency market was considered a revolutionary one (Knežević *et al.*, 2020). However, like any other innovation, cryptocurrencies were no exception to controversy (Treiblmaier and Gorbunov, 2022).

Exploring these controversies and what people thought of this revolutionary market did receive attention in the literature, with multiple studies analyzing people's perceptions, attitudes, and opinions towards cryptocurrencies. Scientists studied what these opinions are, but also what can influence them. By now, what was covered were opinions and perceptions about cryptocurrencies of public officials' (Cagigas *et al.* 2022), cryptocurrencies owners (Steinmetz *et al.*, 2021), the South African virtual community (Walton and Johnston, 2018) and internet users in general (Hassan *et al.*, 2021).

Regarding comparisons about cryptocurrencies opinions (which was the trigger of this study), there are indeed studies comparing opinions of users VS nonusers of cryptocurrencies (Voskobojnikov *et al.*, 2020; Xianyi *et al.*, 2016), perceptions of generation Y VS perceptions of generation Z towards Bitcoin (Gafar *et al.*, 2021), attitudes towards cryptocurrencies in Sweden VS Japan (Grassman *et al.*, 2021) and novice smartphone users' perceptions of paying with Bitcoin VS paying with credit/debit cards (Alshamsi and Andras, 2019). To summarize the main results of the extant studies on the topic of perceptions of cryptocurrencies, even if both users and non-users of cryptocurrencies sometimes misunderstand digital currencies and how they work (Voskobojnikov *et al.* 2020; Xianyi *et al.*, 2016), there are more positive sentiments towards cryptocurrencies amongst internet users (Hassan *et al.*, 2021). However, for cryptocurrencies to be accepted as an official form of payment by public administrations, there is still need for a more public configuration of certain aspects of the blockchain (Cagigas *et al.*, 2022). This is also the reason people perceive cards' usability higher than Bitcoin (Alshamsi and Andras, 2019), even if they do believe in cryptocurrencies' potential to be a future payment method (Baur *et al.*, 2015).

Regardless of what people's opinions about cryptocurrencies are, it is also important to note what influences these opinions, attitudes, and perceptions. Most important such factors found in the consulted research papers are subjective norms (Alaklabi and Kang, 2021; Alzahrani and Daim, 2019), security risk, perception of utility, and enjoyment (Alaklabi and Kang, 2021), technology

awareness and social influence (Dabbous *et al.*, 2022), but also, as mentioned in the introduction section, social media posts (Kyriazis *et al.*, 2022; Reis and Pinho, 2021; Gurdgiev and O'Loughlin, 2020; Alghobiri, 2019) and news (Yao *et al.*, 2019).

When exploring the extant literature on people's perceptions of cryptocurrencies, there are two major gaps identified. The first one was also discussed in the introduction section. Comparing people's opinions about cryptocurrencies was approached in the literature, but most studies have done so at a given period of time, by looking at the perceptions of different groups (Treiblmaier and Gorbunov, 2022; Gafar *et al.*, 2021; Grassman *et al.*, 2021; Voskobojnikov *et al.*, 2020; Xianyi *et al.*, 2016). Thus, we believe that there is a need for more studies covering how perceptions of cryptocurrencies can change over time. The second gap identified is that with a few exceptions (Voskobojnikov *et al.*, 2020; Xianyi *et al.*, 2016; Baur *et al.*, 2015), most studies on the topic of perceptions and attitudes towards cryptocurrencies use a quantitative approach, relying on big data like news (Yao *et al.*, 2019), tweets (Hassan *et al.*, 2021; Alghobiri, 2019) and other social media posts (Grassman *et al.*, 2021) to explore this area. This is of course useful, but it might lack a more in-detail exploration of people's feelings, opinions and associations about cryptocurrencies. To fill the gaps identified in the literature, the aim of this study is to qualitatively analyze people's perceptions of cryptocurrencies and to see if and how these can change over a long period of time if comparing expression of these in a more 'optimistic' context (in March 2022, when the cryptocurrencies market was up) and in a more 'pessimistic' one (during August-November 2022, when prices to most cryptocurrencies were down).

2. Data & Methodology

With this being a comparative study, the same methodology as in the study representing the first wave (conducted in March 2022) (Faraonel *et al.*, 2022) was used for the second wave whose results are reported in the next section. Thus, we have opted for the same qualitative approach, using semi-structured interviews to obtain associations students make when thinking about cryptocurrencies, but also other information like how reliable, trustworthy and secure they perceive cryptocurrencies, what is their willingness to invest in such digital assets and how they get information about this topic. To better highlight what questions we asked our respondents, we will reiterate our main objectives below:

O1. To identify differences in respondents' perceptions of cryptocurrency from March 2022 compared to August-November 2022.

To analyze perceptions, the interviews included questions based on the Top of Mind (Donoghue, 2000) and Chinese Portrait (Duszczyk, 2022) qualitative techniques. Hence, for the former technique, respondents were asked what were the first three words that came into their mind when thinking of cryptocurrencies. For the latter technique, they were asked multiple questions regarding association they would have made between cryptocurrencies and things like currencies, gender, age, occupation and nationality (e.g. *If cryptocurrencies were a gender, then what gender would they be?*, *If cryptocurrencies were an occupation, then what occupation would they be?*, *If cryptocurrencies were a nationality, then what nationality would they be?* etc). After applying these two techniques for gathering mental associations subjects make when thinking of cryptocurrencies, our respondents were asked how secure, reliable and trustworthy they perceive these digital currencies on a scale from 1 to 10.

O2. To identify the current willingness to invest in cryptocurrencies given the circumstances of the cryptocurrencies market.

O2a. To identify the main reasons for the current willingness to invest of respondents.

Respondents were also asked questions about their past/future (if applicable) investments in cryptocurrencies and also what their motivations were for investing/not wanting to invest at all/not wanting to invest anymore (if they had invested before and decided to stop).

O3. To identify the main media outlets utilized by respondents as sources of information pertaining to cryptocurrencies.

Finally, respondents were asked how they got information about this topic. If applicable, they were also asked which crypto influencers they were following. Knowing such details was considered useful from a marketing perspective.

While the first wave of our study gathered answers from 98 students, in the second wave, only 79 answers were valid. The sample structure (of the second wave of the study) is presented in Table 1.

Table 1. Sample structure

	Category	**Wave 1**	
		No. of respondents	**Percentage**
Gender	Female	42	53.2%
	Male	33	41.8%
Age	<20	31	39.2%
	21-27	43	54.4%
	28-34	3	3.8%
	35-41	1	1.3%
	>42	1	1.3%

Field of study	Economics	71	89.9%
	Geography	1	1.3%
	Letters	2	2.5%
	Law	1	1.3%
	Psychology	1	1.3%
	Sociopolitical Sciences & Philosophy	1	1.3%
	Technical	1	1.3%
Monthly income	<500 RON (~100EUR)	24	30.4%
	501-1000 RON (~101-200EUR)	19	24.1%
	1001-2000 RON (~201-400EUR)	12	15.2%
	2001-3000 RON (~401-600EUR)	10	12.7%
	>3001 RON (~601EUR)	14	17.7%

Source: own processing

The information was collected through online interviews. For the ease of collecting data and representing it, we asked the respondents to give their answers in a Google Form aiming to gather the words they would associate cryptocurrencies with. In order to interpret our results, we transposed our data into tables in Excel and IBM SPSS Statistics. Even though our study uses qualitative techniques, and it is mainly exploratory research, we decided to highlight the data using quantitative representations, since they are easier to read and comprehend. Descriptive and inferential statistics were also needed in order to make comparisons between the two waves of the study.

3. Findings

Firstly, respondents were asked what are the first three words that come into their mind when they heard the word "cryptocurrency". This top of mind test showed that the majority of subjects think of money (with 24 people mentioning just the word "money", but more mentioning this word in structures like "digital money", "virtual money" and "online money"), Bitcoin (24 mentions) and scam (9 mentions). The most mentioned two words in this wave were also the most mentioned in the first wave. However, in the first wave, the third most mentioned word was "future" (with 14 mentions), followed by "investment", "ETH" (both with 10 mentions) and "scam" (9 mentions) (Faraonel *et al.*, 2022). Instead of "future", in the second wave, the third most mentioned word was "scam" (9 mentions). "Future" was still mentioned by the respondents in the study's second wave, but more rarely (ranking lower in Table 2). A reason for this could be that the price dropouts that took place on the market in the last months made some people reconsider if cryptocurrencies are really "the future". An important observation here is that the second study collected more negative words associated with cryptocurrencies than the first study. Whilst in the first wave, negative associations

to note (the ones mentioned more than once) were "scam" (9 mentions), "risk" (3 mentions), "insecurity" (2 mentions) and "fraud" (2 mentions) (Faraonel *et al.*, 2022), in this wave, the negative words were "scam" (9 mentions), "volatility" (3 mentions), "fraud" (2 mentions), "loss" (2 mentions), "speculation" (2 mentions), "uncertainty" (2 mentions) and "volatile" (2 mentions).

Table 2. Most mentioned words for the Top-of-Mind test in the second wave of the study (words mentioned only once were not included)

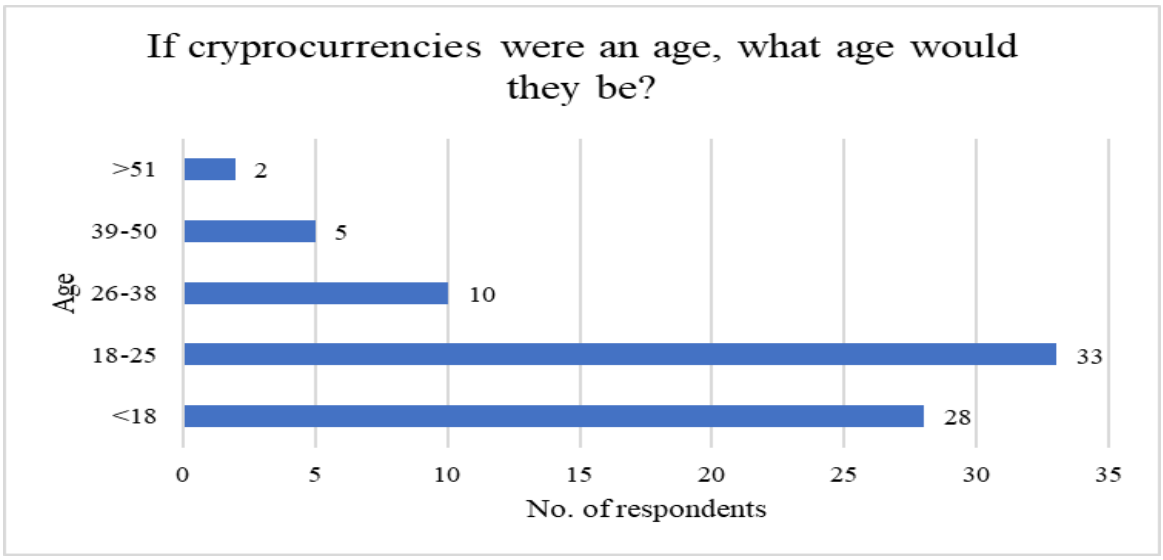
Word	Frequency	Percentage (%)
Bitcoin	24	30.38
Money	24	30.38
Scam	9	11.39
Profit	8	10.13
Blockchain	7	8.86
Technology	7	8.86
Investment	6	7.59
Future	5	6.33
Digital	4	5.06
Volatility	3	3.80
Currency	2	2.53
Elon Musk	2	2.53
Ethereum	2	2.53
Fraud	2	2.53
Loss	2	2.53
Online	2	2.53
Payment	2	2.53
Polkadot	2	2.53
Revolut	2	2.53
Speculation	2	2.53
Uncertainty	2	2.53
Virtual money	2	2.53
Volatile	2	2.53

Source: own processing

Moving on to the Chinese Portrait Technique, after this question, respondents were asked what currency they would have associated cryptocurrencies with. Here, as in the first study, most participants associated cryptocurrencies with Bitcoin (23 of them). This was expected because Bitcoin is the first cryptocurrency that appeared on the market, the most popular one (Chan *et al.*, 2017) the most valuable one, and in general, the behavior of Bitcoin dictates the behavior of the whole market (Nepp and Karpeko, 2022). Bitcoin was followed by USD Dollars (with 15 respondents saying they associate cryptocurrencies with dollars) and EURO (11 mentions).

Furthermore, we wanted to know what associations respondents make between cryptocurrencies and gender, age, nationality, and occupation. Answers were again similar to the ones our respondents gave in the first wave of the study. Hence, concerning the gender, cryptocurrencies were rather associated with a man (with 43 of respondents saying that), which could suggest that they are perceived as strong, tough or "down to earth". However, respondents could also have offered this answer because in general, more men invest in cryptocurrencies or are interested in this field (Morning Consult, 2022; Senkardes and Akadur, 2021). Consequently, there were significantly less respondents saying they would have associated cryptocurrencies with a female (only 22 of them). A few people said that they saw neutrality or no gender in cryptocurrencies (6 mentions) or that cryptocurrencies could be both genders (male and female as well) (1 mention). Turning to age, as in March 2022, most answers lay between 18 and 25 years old (as shown in Figure 1). This could imply that market volatility and multiple changes made respondents associate cryptocurrencies with late teenagers, who are considered more unpredictable and more prone to adopt a change in their life. Table 3 shows no massive change between associations with an occupation from the first and the second wave. Most students associated cryptocurrencies with occupations related to the economic/business field. For nationalities, again, as in the first wave, most students (42, which is more than half of them) associated cryptocurrencies with American nationality. This could be because the United States are known for 'moving' the cryptocurrency market through their influencers and/or important personalities like Elon Musk (Ante, 2023; Hussain Shahzad *et al.*, 2022; Huyhn, 2022), Donald Trump (Huyhn, 2021) or through their market regulations.

Figure 1. Respondents' associations between cryptocurrencies and age



Source: own representation

Table 3. Respondents' associations between cryptocurrencies and occupation (words mentioned just once were not included)

Word	Frequency	Word	Frequency
Business man	6	Banker	8
Trader	4	Investor	5
Investor	4	Freelancer	4
Real estate agent	4	Business man	3
Entrepreneur	3	Broker	2
Politician	2	Entrepreneur	2
Manager	2	Financial analyst	2
Freelancer	2	Lawyer	2
Explorer	2	Teacher	2
Accountant	2		
Banker	2		
Wave1		**Wave2**	

Source: own processing

Top of Mind and Chinese Portrait techniques questions were followed by three questions, asking respondents how reliable, secure, and trustworthy they found cryptocurrencies on a scale from 1 to 10 (with 1 meaning not reliable/secure/trustworthy at all and 10 meaning very reliable/secure/trustworthy). Respondents were explained that by "reliability" we referred to whether cryptocurrencies were reliable over a long period of time and by "trustworthiness" we wanted to know if they were perceiving cryptocurrencies as trustworthy in the moment they were given us the answer. For all the three dimensions, we can notice in Table 4, that the mean is lower with around 1 point for each in the second wave than in the first wave, this implying that the changes on the market could have indeed changed our respondents' minds. However, when running an independent-sample t-test, there was no significant difference in mean between how reliable/secure/trustworthy respondents perceived cryptocurrencies in the first wave and in the second wave (see Table 5).

Table 4. Means of how reliable/secure/trustworthy respondents perceived cryptocurrencies (on a scale from 1 to 10) in the first wave VS in the second wave

	Wave	N	Mean	Std. Deviation	Std. Error Mean
Reliable	1,00	98	6.1633	2.63870	0.26655
	2,00	79	5.0253	2.63592	0.29656
Secure	1,00	98	6.1020	2.74140	0.27692
	2,00	79	5.0000	3.00000	0.33753
Trustworthy	1,00	98	5.7347	2.69613	0.27235
	2,00	79	4.6076	2.77081	0.31174

Source: own processing

Table 5. Differences in means of how reliable/secure/trustworthy respondents perceived cryptocurrencies (on a scale from 1 to 10) (not statistically significant)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Reliable	Equal variances assumed	0.061	0.806	2.853	175	0.005	1.13795	0.39879	0.35089	1.92501
	Equal variances not assumed			2.854	167.189	0.005	1.13795	0.39875	0.35072	1.92518
Secure	Equal variances assumed	0.999	0.319	2.549	175	0.012	1.10204	0.43237	0.24871	1.95538
	Equal variances not assumed			2.524	160.040	0.013	1.10204	0.43659	0.23982	1.96426
Trustworthy	Equal variances assumed	0.936	0.335	2.731	175	0.007	1.12710	0.41273	0.31252	1.94167
	Equal variances not assumed			2.723	165.145	0.007	1.12710	0.41395	0.30978	1.94442

Source: own processing

Respondents were also asked if they had ever invested in cryptocurrencies, and 32 out of 79 from the second wave (40,5%) said they had done so. Using this information, we wanted to compare how reliable, secure, and trustworthy respondents perceived cryptocurrencies based on their previous investments in such assets. Whilst concerning reliability, there was no statistically significant difference in how reliable cryptocurrencies are perceived by those who had previously invested in such assets VS by those who had never done so (see Table 6, where Sig value>0.05), concerning security and trustworthiness, we can notice (in Table 7 and Table 8, respectively) that there is a statistically significant difference between how secure/trustworthy cryptocurrencies are perceived by those who had previously invested in these assets VS by those who had not done so before (with a 99% confidence interval for security, where Sig<0.01 and 90% confidence interval for trustworthiness, where Sig<0.10). Thus, those who had previously invested in cryptocurrencies tend to perceive them with 2 points more secure and with 1,18 points more trustworthy (on a scale from 1 to 10) on average than those who had never done so.

Table 6. Differences in levels of reliability of cryptocurrencies as perceived by students who had invested and who had never invested in cryptocurrencies (not statistically significant)

Group Statistics					
previous_investment_in_crypto_wave2		N	Mean	Std. Deviation	Std. Error Mean
Reliable_wave2	No	47	5.17	2.435	0.355
	Yes	32	5.44	2.341	0.414

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Reliable_wave2	Equal variances assumed	0.654	0.421	-0.486	77	0.628	-0.267	0.549	-1.361	0.827
	Equal variances not assumed			-0.490	68.452	0.626	-0.267	0.545	-1.355	0.821

Source: own processing

Table 7. Differences in levels of security of cryptocurrencies as perceived by students who had invested and who had never invested in cryptocurrencies (statistically significant with a 99% confidence interval)

Group Statistics				
previous_investment_in_crypto_wave2	N	Mean	Std. Deviation	Std. Error Mean
Secure_wave2 No	47	4.1915	2.48157	0.36197
Secure_wave2 Yes	32	6.1875	3.32573	0.58791

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Secure_wave2	Equal variances assumed	8.449	0.005	-3.054	77	0.003	-1.99601	0.65356	-3.29741	-0.69461
	Equal variances not assumed			-2.891	53.752	0.006	-1.99601	0.69041	-3.38034	-0.61168

Source: own processing

Table 8. Differences in levels of trustworthiness of cryptocurrencies as perceived by students who had invested and who had never invested in cryptocurrencies (statistically significant with a 90% confidence interval)

Group Statistics				
previous_investment_in_crypto_wave2	N	Mean	Std. Deviation	Std. Error Mean
Trustworthy_wave2 No	47	4.1277	2.53340	0.36953
Trustworthy_wave2 Yes	32	5.3125	2.98855	0.52831

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Trustworthy_wave2	Equal variances assumed	3.016	0.086	-1.897	77	0.062	-1.18484	0.62472	-2.42881	0.05913
	Equal variances not assumed			-1.838	59.204	0.071	-1.18484	0.64472	-2.47483	0.10515

Source: own processing

Regardless of their previous investments in cryptocurrency, respondents were asked if they were willing to (re)invest in such digital assets. Even if our subjects tended in general to find cryptocurrencies less reliable, secure, and trustworthy than in the first wave, more than half of them (60,8%) said they would (re)invest a certain amount of money in such assets. This was also the case in the first wave, when around 68,4% of respondents said that they would have (re)invested in cryptocurrencies. Thus, although the prices on the market have dropped significantly between the two waves, we can only see an 8% decrease in willingness to (re)invest in cryptocurrencies. Table 9 shows a comparison between the results.

Table 9. Willingness to (re)invest in cryptocurrencies (in RON) of respondents from the second wave (left) compared to willingness to (re)invest in the first wave (right)

	Willingness to invest in RON wave 2		Willingness to invest in RON wave 1	
	Frequency	Percent	Frequency	Percent
Not willing to invest	31	39.2	31	31.6
less than 100 RON	18	22.8	23	23.5
101-500 RON	18	22.8	16	16.3
501-1000 RON	6	7.6	14	14.3
more than 1000 RON	6	7.6	14	14.3
Total	79	100.0	98	100.0

Source: own processing

The current willingness to invest in cryptocurrencies did not seem associated with previous investment in cryptocurrencies (as our Chi Square test in Table 10 suggests no relationship between these two), but we found a statistically significant difference in how secure/trustworthy respondents perceived cryptocurrencies based on the amount they were willing to invest in these assets (not applicable for how reliable they perceived them). Hence, Table 11 shows no statistically significant difference in how reliable respondents perceived cryptocurrencies based on their willingness to invest in these assets. However, Table 12 shows statistically significant differences between the means of perceived security of respondents not wanting to invest at all in cryptocurrencies and those willing to invest larger amounts of money (more than 500 RON, which is approximately 100 EUR). Thus, on average, on a scale from 1 to 10, those not willing to invest at all in cryptocurrencies perceive them 4,82 less secure than those who want to invest more than 1000 RON (approximately 200 EUR) and 3,82 less secure than those willing to invest 501-1000 RON (approximately 101-200 EUR). This suggests that the more secure people perceive cryptocurrencies, the larger the amount they are willing to invest. The same stands for how trustworthy people perceive cryptocurrencies. Hence, as shown in Table 13 those not willing to invest at all in cryptocurrencies perceive them, on average, on a scale

from 1 to 10, 5,13 less trustworthy than those who want to invest more than 1000 RON (approximately 200 EUR), 4,13 less trustworthy than those willing to invest 501-1000 RON (approximately 101-200 EUR) and 2,07 less trustworthy than those willing to invest no more than 100 RON (approximately 20 EUR). In addition, those willing to invest a small amount (101-500 RON, which equals approximately 21-100 EUR) in cryptocurrencies perceive them, on average, on a scale from 1 to 10, with 3,38 less trustworthy than those willing to invest more than 1000 RON (approximately 20 EUR) (which is a larger amount of money).

Table 10. Association between previous investment in cryptocurrencies and the current willingness to invest in these assets (not statistically significant)

previous_investment_in_crypto_wave2 * Willingness_to_invest_atm_wave2 Crosstabulation

			Willingness_to_invest_atm_wave2		Total
			Yes	No	
previous_investment_in_crypto_wave2	No	Count	27	20	47
		Expected Count	28.6	18.4	47.0
	Yes	Count	21	11	32
		Expected Count	19.4	12.6	32.0
	Total	Count	48	31	79
		Expected Count	48.0	31.0	79.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.534[a]	1	0.465		
Continuity Correction[b]	0.246	1	0.620		
Likelihood Ratio	0.537	1	0.464		
Fisher's Exact Test				0.492	0.311
Linear-by-Linear Association	0.527	1	0.468		
N of Valid Cases	79				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 12,56.
b. Computed only for a 2x2 table

Source: own processing

Table 11. Differences in how reliable respondents perceived cryptocurrencies based on their willingness to invest in these assets (not statistically significant)

ANOVA

Reliable_wave2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.336	4	1.334	0.225	0.924
Within Groups	438.538	74	5.926		
Total	443.873	78			

Source: own processing

Table 12. Differences in how secure respondents perceived cryptocurrencies based on their willingness to invest in these assets (statistically significant)

ANOVA

Secure_wave2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	165.948	4	41.487	5.727	0.000
Within Groups	536.052	74	7.244		
Total	702.000	78			

Multiple Comparisons

Dependent Variable: Secure_wave2

Tukey HSD

(I) Willingness_to_invest_atm_wave2_inRON		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Not willing to invest	less than 100 RON	-1.48925	0.79757	0.344	-3.7194	0.7409
	101-500 RON	-1.43369	0.79757	0.383	-3.6638	0.7965
	501-1000 RON	-3,82258*	1.20042	0.018	-7.1792	-0.4660
	more than 1000 RON	-4,82258*	1.20042	0.001	-8.1792	-1.4660
less than 100 RON	Not willing to invest	1.48925	0.79757	0.344	-0.7409	3.7194
	101-500 RON	0.05556	0.89715	1.000	-2.4530	2.5642
	501-1000 RON	-2.33333	1.26877	0.359	-5.8810	1.2144
	more than 1000 RON	-3.33333	1.26877	0.076	-6.8810	0.2144
101-500 RON	Not willing to invest	1.43369	0.79757	0.383	-0.7965	3.6638
	less than 100 RON	-0.05556	0.89715	1.000	-2.5642	2.4530
	501-1000 RON	-2.38889	1.26877	0.336	-5.9366	1.1588
	more than 1000 RON	-3.38889	1.26877	0.068	-6.9366	0.1588
501-1000 RON	Not willing to invest	3,82258*	1.20042	0.018	0.4660	7.1792
	less than 100 RON	2.33333	1.26877	0.359	-1.2144	5.8810
	101-500 RON	2.38889	1.26877	0.336	-1.1588	5.9366
	more than 1000 RON	-1.00000	1.55391	0.967	-5.3450	3.3450
more than 1000 RON	Not willing to invest	4,82258*	1.20042	0.001	1.4660	8.1792
	less than 100 RON	3.33333	1.26877	0.076	-0.2144	6.8810
	101-500 RON	3.38889	1.26877	0.068	-0.1588	6.9366
	501-1000 RON	1.00000	1.55391	0.967	-3.3450	5.3450

*. The mean difference is significant at the 0.05 level.

Source: own processing

Table 13. Differences in how trustworthy respondents perceived cryptocurrencies based on their willingness to invest in these assets (statistically significant)

ANOVA

Trustworthy_wave2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	197.312	4	49.328	9.091	0.000
Within Groups	401.523	74	5.426		
Total	598.835	78			

Multiple Comparisons

Dependent Variable: Trustworthy_wave2
Tukey HSD

(I) Willingness_to_invest_atm_wave2_inRON		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Not willing to invest	less than 100 RON	-2,07885*	0.69027	0.028	-4.0090	-0.1487
	101-500 RON	-1.74552	0.69027	0.095	-3.6756	0.1846
	501-1000 RON	-4,13441*	1.03892	0.001	-7.0394	-1.2294
	more than 1000 RON	-5,13441*	1.03892	0.000	-8.0394	-2.2294
less than 100 RON	Not willing to invest	2,07885*	0.69027	0.028	0.1487	4.0090
	101-500 RON	0.33333	0.77646	0.993	-1.8378	2.5044
	501-1000 RON	-2.05556	1.09808	0.341	-5.1260	1.0149
	more than 1000 RON	-3.05556	1.09808	0.052	-6.1260	0.0149
101-500 RON	Not willing to invest	1.74552	0.69027	0.095	-0.1846	3.6756
	less than 100 RON	-0.33333	0.77646	0.993	-2.5044	1.8378
	501-1000 RON	-2.38889	1.09808	0.200	-5.4593	0.6815
	more than 1000 RON	-3,38889*	1.09808	0.023	-6.4593	-0.3185
501-1000 RON	Not willing to invest	4,13441*	1.03892	0.001	1.2294	7.0394
	less than 100 RON	2.05556	1.09808	0.341	-1.0149	5.1260
	101-500 RON	2.38889	1.09808	0.200	-0.6815	5.4593
	more than 1000 RON	-1.00000	1.34487	0.945	-4.7605	2.7605
more than 1000 RON	Not willing to invest	5,13441*	1.03892	0.000	2.2294	8.0394
	less than 100 RON	3.05556	1.09808	0.052	-0.0149	6.1260
	101-500 RON	3,38889*	1.09808	0.023	0.3185	6.4593
	501-1000 RON	1.00000	1.34487	0.945	-2.7605	4.7605

*. The mean difference is significant at the 0.05 level.

Source: own processing

We have also explored reasons people have for investing in cryptocurrencies, for not investing at all in cryptocurrencies or for not wanting to invest anymore in such assets. When asked about reasons for currently investing in cryptocurrencies, the majority of respondents that reported to do so (8 out of 14) said that investing in cryptocurrencies did not offer them an additional income at the moment of the interview, but that they believed it could have done so in the future. This supports the results of previous studies discovering that the most encouraging factor for investing in cryptocurrencies is the rapid increase in cryptocurrencies value (Smutny *et al.*, 2021), which suggests that a major motivation for investing in these assets is an expected (rapid) profit. However, our finding also contradicts other studies which discovered that profit expectancy is not always a motivational factor when investing in cryptocurrencies. People do it also because they support Bitcoin technology (Mattke *et al.*, 2021).

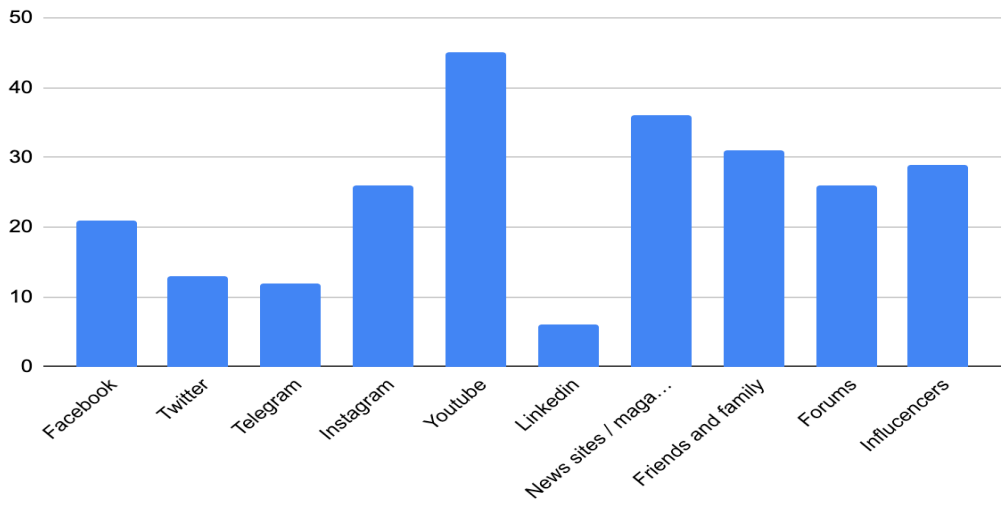
Concerning reasons for not investing at all, out of 48 respondents, 30 mentioned that they did not have enough knowledge about it, 25 that they did not have enough money for investing, 23 that

they were not sure about how secure/trustworthy the crypto market was, and 18 that they did not trust crypto market at all. The most frequent answer (not having enough knowledge about it) highlights the complexity of blockchain technology and supports the affirmation of Treiblmaier and Gorbunov (2022) who state that in general, just a few people are really aware of how the cryptocurrencies work.

Regarding reasons for stopping cryptocurrencies investments, most of the respondents (9 out of 18) reported that they had lost money. However, this contradicts previous research, which discovered that a negative experience with investment in cryptocurrency constitutes the most minor barrier, while the biggest one is the lack of experience with investment in general (Smutny *et al.*, 2021) (which was frequently mentioned by our respondents too).

We have also asked our respondents where they got information about cryptocurrencies from. Data shown in Figure 2 indicates that participants were interested in obtaining information about cryptocurrencies despite the market conditions.

Figure 2. Main sources of information about cryptocurrencies



Source: own representation

Respondents' most prevalent sources of information were YouTube and news sites/magazines. This suggests that the participants may have been seeking more general information about the technology and the innovations behind cryptocurrencies rather than focusing solely on their current market value. Social media platforms, such as Facebook, Instagram, and Twitter, were also identified as popular sources of information. This indicates that the participants may have been exposed to much information about cryptocurrencies through their friends and family, who may have shared articles, posts, or videos about the topic. Telegram, Forums, and Influencers were also

mentioned. This suggests that the participants may have been seeking more specialized or niche information about cryptocurrencies, such as trading strategies, technical analysis, or expert opinions from others in the field. LinkedIn was the least popular source of information. This may be because LinkedIn is more of a professional networking platform and less focused on general news and discussion, which may be less relevant to the participants' interests in cryptocurrencies. To summarize, the data indicates that participants were interested in obtaining a wide range of information about cryptocurrencies, from general information to more specialized and niche topics. As in the first study (Faraonel *et al.*, 2022), social media platforms seemed to play a huge role in the cryptocurrencies space. These findings can aid in identifying new ways to communicate with the audience interested in cryptocurrencies, depending on the types of information they seek.

Based on our previous study (Faraonel *et al.*, 2022), we also assumed that the respondents followed cryptocurrency influencers and asked them what influencers exactly they followed (if applicable). Interestingly, most respondents mentioned that they did not follow any crypto influencer (38 respondents, which represents 48,1% of the total respondents). This may indicate that they are not actively seeking information or advice from influencers in the cryptocurrency space and may have their own methods for researching and understanding the cryptocurrency market. However, if we compare the data with our previous study (Faraonel *et al.*, 2022), when only 20 respondents said that they did not follow any crypto influencer (which represented 20,4% of the total respondents) we can see that the Romanian students are more drawn back by the idea of following any influencer in a bear market than in a bull market.

Elon Musk was the most popular influencer among the respondents who said they did follow at least one crypto influencer (with 31 mentions). Following Elon Musk may happen due to his well-known reputation as an entrepreneur and his recent involvement in the cryptocurrency space, especially by his tweets about Dogecoin, which caused a significant increase in its value (Ante, 2023). The second most popular influencer amongst our respondents was Cristian Chifoi (mentioned 17 times), which may indicate that Romanian students are interested in influencers who provide market analysis and investment advice. George Buhnici and CryptoRo are also popular among the students. This could be due to their expertise in the crypto market and their ability to provide valuable insights in the Romanian language. Changpeng (CZ) Zhao, Pomp (APompliano), The Wolf of all Streets, The Crypto Dog, Coin Bureau, Barry Silbert, BitBoy and Daniel Mihai were also mentioned, but they are less popular amongst our respondents.

4. Discussions

O1. To identify differences in respondents' perceptions of cryptocurrency from March 2022 compared to August-November 2022.

To tackle our first objective, perceptions of cryptocurrencies did change from some points of view from March 2022 until August-November 2022. Most respondents still thought of money and Bitcoin when hearing the word cryptocurrency (with these two words being the most mentioned words in both studies), but the second wave of the study registered more negative associations than the first one (gathering associations like 'scam', 'fraud', 'loss' or 'volatility'). One of the reasons for it could be the drastic changes in the cryptocurrency market during the summer. Another significant change worth mentioning is the drop of 1 point in the mean of the answers in how secure, reliable and trustworthy respondents felt cryptocurrencies. Here, respondents who have previously invested in cryptocurrencies tend to perceive them more secure and trustworthy than those who have never done so.

Besides all the changes that have happened during the time between the two studies, there are some characteristics and perceptions that did not change. The constant associations respondents made with cryptocurrencies were young (for associations with age), which indicates volatility, man (for associations with gender), which indicates strength, American (for associations with nationality) and economic/business field (for associations with occupations).

O2. To identify the current willingness to invest in cryptocurrencies given the circumstances of the cryptocurrencies market.

When exploring our respondents' willingness to invest in cryptocurrencies, we have noticed only an 8% decrease in willingness to (re)invest in cryptocurrencies from March 2022 to August-November 2022. A worth mentioning fact (and also worth exploring in future research) is that those who perceive cryptocurrencies as more secure and trustworthy, could be more likely to invest larger amounts of money in these assets.

O2a. To identify the main reasons for the current willingness to invest of respondents.

Concerning reasons for investing/not investing at all or stopping cryptocurrency investments, our findings did both support and contradict previous studies. Most of the respondents who were investors reported that they did not get a regular income from their investments, but they thought they could have done so in the future. This suggested that they were expecting a certain profit, supporting the view of Smutny *et al.* (2021), who identified that the most encouraging factor for investing in cryptocurrencies is the rapid increase in cryptocurrencies value (which can lead to a rapid profit). At the same time, our finding contradicted other studies which discovered that profit expectancy is not

always a motivational factor when investing in cryptocurrencies since people do it also because they support Bitcoin technology (Mattke *et al.*, 2021).

The most frequent answer for not investing at all in cryptocurrencies was not having enough knowledge about it, which highlights the complexity of blockchain technology spotted by Treiblmaier and Gorbunov (2022) who state that in general, just a few people are completely aware of how the cryptocurrencies work. Our finding also supports the view of Smutny *et al.* (2021), who found that the lack of experience with investments is a major deterrent in investments.

Regarding reasons for stopping cryptocurrencies investments, most of the respondents reported that they had lost money. However, this contradicts previous research, since a negative experience with investment in cryptocurrency constitutes the most minor barrier in investing, while the biggest one is the lack of experience with investment in general (Smutny *et al.*, 2021).

O3. To identify the main media outlets utilized by respondents as sources of information pertaining to cryptocurrencies.

We observed that there were no big differences between the media channels used by respondents to get information about cryptocurrencies in March 2022 compared to August 2022. The most used media channel in both studies was YouTube, but our respondents mentioned multiple and various sources of information (especially social media platforms). This suggests that participants seemed interested in obtaining a wide range of information about cryptocurrencies, from general information to more specialized and niche topics, but also supports the importance of social media in gathering information (in general and about cryptocurrencies). Our findings could aid in identifying key opinion leaders and influencers in the crypto space and could be useful for crypto-related businesses when targeting their marketing efforts. One interesting fact is that Telegram was not mentioned that much in this wave (and neither in the first wave), even if it is considered 'the ultimate hub' for communication and information for cryptocurrencies (Melinek, 2022).

Conclusions, limitations of the study and future research directions

In conclusion, even if the summer of 2022 brought significant changes to the cryptocurrency market, perceptions of cryptocurrencies did not change that much. Indeed, respondents tended to associate cryptocurrencies with more negative words like 'scam', 'fraud' or 'loss'. However, their willingness to invest in such assets was not vanished by these perceptions. Our respondents seemed to wish to 'try their luck' with cryptocurrencies, stating that they would invest (most of them) small amounts of money in cryptocurrencies.

By this qualitative approach aiming to explore opinions, attitudes and perceptions Romanian students have towards cryptocurrencies, this paper significantly contributes to academic knowledge about cryptocurrencies in multiple ways. First of all, using students as respondents offers a better understanding of how the new generation perceives the new technology of cryptocurrencies, especially because this generation is known to be more open to new technologies and also more likely to adopt and use them, as they are considered "tech-savvy" (Ramgade and Kumar, 2021, p. 338). Also, studies have found that current owners of cryptocurrency are significantly younger than those who have never owned any (Steinmetz *et al.*, 2021). Secondly, knowing this generations' perceptions of cryptocurrencies is significantly useful for exploring, understanding, and even predicting trends in the cryptocurrencies market. Youngsters are known to spend a lot of time on social media (Ramgade and Kumar, 2021) and they sometimes share their thoughts on social networks (Georgescu and Popescul, 2018). They also use social networks as a medium to get information from, as discovered in our study but also in previous research (Hamid *et al.*, 2016; Westerman *et al.*, 2014). Since the cryptocurrencies market is strongly influenced by social media (Ante, 2023; Kyriazis *et al.*, 2022; Ortu *et al.*, 2022), knowing what people who spend more time on social networks think of cryptocurrencies becomes valuable for traders and researchers in this field as well. Such information is also useful from a herding-behavior perspective since the cryptocurrencies market is characterized by such behaviors (de Souza *et al.*, 2020). Finally, we believe that our research can also be useful for regulators of the cryptocurrencies market, as it is important for them to know what people think of cryptocurrencies, with a focus on what risks they perceive and reasons for investing/not investing at all/not investing anymore.

This study has limitations too. The main limitation was also mentioned in the introduction section, and it is that we cannot be sure that the results of the first study differ from the results of the second study only due to changes in the cryptocurrencies market. The long period of time passed between the two waves of the study could be marked by other events making respondents change their opinions (discussions with friends/relatives, encountering financial gains/difficulties etc). However, we still believe that knowing students' perceptions of cryptocurrencies is valuable, even if through this study it cannot be said exactly what are the factors making people have these opinions. To fill this gap, further research could explore motivations people have when expressing an opinion towards cryptocurrencies, since the current study only asked respondents what the reasons were for investing/not investing in cryptocurrencies but did not ask the respondents to elaborate on why they make certain associations or why they perceive cryptocurrencies in a certain way.

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