

Sources of Knowledge About Cryptocurrencies: Polish Students Perspective

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Abstract: People obtain knowledge from different sources, depending on the issues that they wish to analyze or resolve. In this paper, the authors examine the sources of knowledge on cryptocurrencies that can be useful for young people. The authors used a survey questionnaire to collect empirical data. The sample consisted of students from Polish universities representing the population that is particularly interested in new technologies and solutions emerging on the market, as exemplified by cryptocurrencies. The purpose of this paper is to find an answer to the main research question: What sources of knowledge about cryptocurrencies have students used? Two criteria were taken into account, namely the respondents' gender and the location of the universities where they studied. The general results showed that students choose modern, preferably well-known sources of knowledge about cryptocurrencies such as popular information websites and social media as well as information provided by their family and friends. The gender analysis showed that the main differences concern the sources of knowledge on cryptocurrencies: popular information websites were chosen more often by men, whereas television and radio were used more frequently by females. Regarding the location of the university, our findings showed that the approach of students to sources of knowledge tends to be similar, regardless of whether they study in Warsaw or Katowice. A difference was found for only one variable, i.e., family and friends. Thus, family and friends were a source of knowledge that students from Warsaw used more frequently than those from Katowice. It may indicate that metropolitan students are more sociable or family-minded.

Keywords: knowledge, sources of knowledge, cryptocurrencies, Bitcoin, Poland perspective

1. Introduction

The value of knowledge for modern people increases over the time. Currently there is an agreement in the literature that knowledge is a strategic resource supporting people in achieving and developing their own goals (Aghamirian, Dorri, & Aghamirian, 2015; Tsai, Tsai, Li, & Lin, 2012; Tseng, 2016; Song & Kang, 2016). There are two main sources of knowledge that people can employ. The first one is the sources of knowledge that exist inside enterprises and which enterprises often share with people to achieve their preconceived goals. The second one is the sources of knowledge that exist outside enterprises and which can support people in decision making. The subject of these sources can be consumers and other internet users. These sources of knowledge can be beneficial for both enterprises and people. From those perspectives people can create sources of knowledge on their own and others can use them for their own purposes. Today, ICT play a key role as the sources of knowledge.

Considering the constant change of people's needs and expectations, their willingness to share knowledge (Ziemba & Eisenhardt, 2014) and the continuous development of ICT, which are leading sources of knowledge for many users, people face the challenge of choosing the right sources of knowledge that will enable them to gain knowledge on a specific topic and solution to a specific problem. So they have to decide what sources they want to use, especially if the solutions they are looking for are to specific and innovative problems. In this study, knowledge about cryptocurrencies is considered as a specific problem that people seek knowledge about.

There is a numerous of papers on sources of knowledge that can be found easily (Dost et al., 2020; Hansson, 2020; Kotwica, 2020; Liu & Liu, 2008; Raisi et al., 2020; Tang et al., 2019; Wermke, 2012). Nonetheless, we noticed that there is a lack of papers on sources of knowledge that people use for specific and novel problems. Therefore, we would like to fill this gap with our investigation and results. This paper aims to answer the main research question: What sources of knowledge about cryptocurrencies have students employed? Accordingly, the objectives of the paper are twofold. First, a general analysis of the sources of knowledge about cryptocurrencies that people use was performed. Second, a thorough analyses were performed focusing on such peoples' characteristics as gender and university environment. Studying the statistically significant differences between the sources of knowledge that people use was the main goal of this part of the paper. In practical terms,

the findings showed which sources of knowledge are leading ones for people when they are focusing on specific and quite new issues such as cryptocurrencies.

The sample choice for our research was on purpose. We decided to address our survey to young people only, i.e., university students as they are the group of people who are particularly interested in new technologies and solutions emerging on the market, which are exemplified by cryptocurrencies (Gogus & Saygın, 2019; Szymkowiak et al., 2021). Moreover, our teaching practices have shown that more and more students have experience with cryptocurrencies. They are trying to deepen their knowledge about this issue using different sources of knowledge, both technological and standard ones, focusing on searching and digging for cryptocurrencies for two main purposes, i.e., (1) as a kind of entertainment and way of spending their spare time and (2) as the possibility to make some profit.

The paper is organized as follows: the research questions and hypothesis are followed by the research methodology; then results, analysis, and discussion are provided; and the paper concludes with a summary, limitations, and avenues for future research.

2. Literature background

2.1 Review of literature on cryptocurrencies

Cryptocurrencies are a relatively new term and Bitcoin (BTC) may be considered as the first cryptocurrency. Bitcoin was introduced on October 31, 2008 to a cryptography mailing list. On January 12, 2009 the first BTC transaction took place. On May 24, 2009 a paper of Satoshi Nakamoto was released (Nakamoto, 2009). There are various assumptions who Satoshi Nakamoto really is (Vigna, 2021; Who is, 2021; Sharma, 2021). Thereby, the authorship is puzzling and seems to have become a sensation recently again. Some researchers and journalists proposed that the name 'Satoshi Nakamoto' was derived from a combination of names of tech companies consisting of Samsung, Toshiba, Nakayama, and Motorola. Even NSA agency and USA government are mentioned in the context of BTC's creators. Regardless of who Satoshi Nakamoto actually is, his paper (Nakamoto, 2009) is regarded as the beginning of Bitcoin and cryptocurrencies in general.

Several years after the appearance of the first cryptocurrency, it was enough for an incredible development in this matter. According to data of CoinMarketCap on March 27, 2022 there are 9.735 different cryptocurrencies. Their market cap is \$ 2 013 706 496 153 and the dominant cryptocurrencies are BTC: 42.0% of the market and Ethereum (ETH): 18.8% of the market (CoinMarketCap, 2022).

It is difficult to underestimate the phenomenon of cryptocurrencies, if only because of the new technology on which they are based (blockchain) (Tapscott & Tapscott, 2016), the amount of market capitalization, the value of which was quoted above, or the general level of interest in them by the big market players (Phillips & Graves, 2021; Sharma, 2022). Some authors consider it as a permanent alternative to the current money. The literature indicates lists of advantages and disadvantages, and even some dangers that cryptocurrencies bring.

Governments of different countries treat cryptocurrencies very unevenly. In fact, cryptocurrencies are a kind of tokens, analogous to those used, for example, in casinos. However, these tokens are only digital or virtual. The question arises, is it therefore possible to treat cryptocurrencies as a currency unit, means of payment or electronic money? Many countries do not consider cryptocurrencies this way. Some even indicate that their trading is illegal (Venezuela). Some countries do not have a precise position on this issue (such as Brazil). On the other hand, some countries consider a selection of them as means of payment (El Salvador) (Maziarz, 2021) or a completely legal equivalent of traditional money (Germany, Switzerland). An interesting case is Poland that considers cryptocurrency trading as legal and even taxed it, however does not treat cryptocurrencies as a full-fledged currency (Rooney, 2018; Podatek, 2021).

From the investors' point of view, cryptocurrencies can be treated purely speculatively, but there is also a noticeable trend to treat them as even "gold of the 21st century" (Kopańko & Kozłowski, 2015; Pandemia..., 2022) That is because, like gold, cryptocurrencies seem to be a good security in times of crises. Currently, it is said that cryptocurrencies can resist inflation. The example of Venezuela, where cryptocurrency trading is prohibited indeed, confirms this. The cryptocurrencies could also be used to support, and on the other hand, to bypass the legal flow of funds or to circumvent imposed economic sanctions (Suraj, 2022). Yet another issue is the dangerous – energy consumption of cryptocurrencies (Greenberg & Bugden, 2019; Corbet, Lucey,

& Yarovaya, 2021). Therefore, there are more and more opinions that mining cryptocurrencies is sometimes contrary to ecology.

2.2 Sources of knowledge that people use and prefer for specific purposes

In epistemological terms, there are four standard basic sources, from which one can acquire knowledge or justified belief, i.e., perception, memory, consciousness, and reason (Audi, 2009). However, in the context of the development of ICT and in connection with business needs, the sources of knowledge have acquired new connotations.

People obtain knowledge from different sources depending on purposes for which they are searching for knowledge and their personal needs (Dąbrowski, 2018). These sources can vary depending on the problems which people want to go through or solve using this knowledge. From that perspective people's problems can be typical, widely discussed on the internet and in person. On the other hand, the problems can be specific and niche. They can often involve newest issues and people need to use specific sources of knowledge to tackle these problems and issues.

The literature review showed that people often use such sources of knowledge as print media, TV and radio, universities and schools, popular information websites, e-mails, instant messengers, and family and friends mainly for typical and routine purpose, i.e., to search for information on subjects that matter at the moment such as school-, health-, security-, work-related (Jiyoon & Junseok, 2020; Lissitsa & Laor, 2021; Qin et al., 2021). Other times they use more specific sources of knowledge as company promotional campaign, social media, mobile applications. That is especially true when the phenomenon that they would like to uncover is quite new and not typical (Arrigo, Liberati, & Mariani, 2021; Raza, Usman, & Ali, 2022). From that perspective, cryptocurrencies could be an example of such phenomena as they are quite new. Obviously, the popularity of cryptocurrency-related issues has been increasing over the last years, but they are still considered as a new ones.

The point is that there is a massive literature on knowledge and knowledge sources analysed from many perspectives. Researchers focus on consumers as the source of knowledge, particularly for business purposes (von Hippel, 2017; de Jong, Gillert, & Stock, 2018; Ziemba & Eisenhardt, 2016). One can find the evidence for typical and well-known sources of knowledge that people use. From those perspectives people chose the sources of knowledge that they know well, are easy accessible for them, and convenient.

What is more, the place of living and education is crucial as well. Universities are ranked internationally. These rankings often show that metropolitan universities, like the University of Warsaw is, are evaluated better and, in turn, ranked higher in comparison with the universities from other parts of particular countries (Scimago, 2022; TopUniversities 2022). The SCImago's (2022) universities ranking included two universities taken into consideration in this paper. The University of Warsaw is ranked at the 343 position whilst the University of Economics in Katowice is ranked at position no. 622.

3. Research methodology

3.1 Research goal and questions

The main goal of this paper is to find an answer to the main research question: : What sources of knowledge about cryptocurrencies have students employed?

To achieve this goal, the study focused on addressing the following research questions:

RQ1: What are the differences and similarities between males and females in the sources of knowledge about cryptocurrencies?

RQ2: What are the differences and similarities between students from the environment of two universities as to the sources of knowledge about cryptocurrencies?

To generate findings on questions RQ1 and RQ2, two hypotheses were developed:

H1: There are statistically significant differences in sources of knowledge about cryptocurrencies used by males and females.

H2: There are statistically significant differences in sources of knowledge about cryptocurrencies for students from the environment of two universities.

3.2 Research procedure

To address the main research problem, answer the specific research questions, and test the formulated hypotheses, a quantitative research approach was adopted and a questionnaire survey was conducted. The research process consists of the following stages:

1. A pilot survey questionnaire was designed. The purpose of the questionnaire was to collect students' opinions about cryptocurrencies. It contained a question: What was your source of knowledge about cryptocurrencies? We used Yes/No scale for this question. Students could choose from a given list of sources. In October 2021, the pilot survey was conducted leading to substantive and methodological scrutiny of the questionnaire.
2. The survey questionnaire was distributed online. We used LimeSurvey software. Data collection took place between November 2021 and February 2022. The sample choice was on purpose as the university students were in our scope. We addressed the survey to two distinct university environments, placed in different regions of Poland. The first, the University of Warsaw, is the biggest and the best ranked university in Poland. it is located in central Poland. The second one, the University of Economics in Katowice, is located in southern and the most industrial region in Poland – Silesia, and its rank is lower (SCImago, 2022). The point was to know students' opinions on specific sources of knowledge about cryptocurrencies, from two university environments. After screening the responses and excluding outliers, there was a final research sample of 778 usable, correct and complete questionnaires. The sample is presented in Table 1.

Table 1: Demographics of the research sample

	Demographic profile	Number of respondents	Percentage
University	University of Warsaw	382	49.1%
	University of Economics in Katowice	396	50.9%
Gender	females	413	53.1%
	males	365	46.9%
Age/ generation	X: 1965-1979	32	4.1%
	Y: 1980-1994	58	7.5%
	Z: 1995-2009	679	87.3%
Level of education	higher education	279	35.9%
	secondary education	499	64.1%

Source: own elaboration.

1. The data were stored in Microsoft Excel. Using Excel and Statistica ver. 13.3 package, the collected data were analyzed. To generate findings on the research questions the frequency procedures were employed as there were convenient samples in the study. The Chi² test was used to determine whether the hypotheses posted were supported by empirical data. This test is appropriate for analyzing differences between independent samples such as males and females as well as students from two distinct universities. Moreover, these tests do not make any assumptions related to the distribution (the distribution was checked using Shapiro-Wilk test for p=0.05).

4. Results

4.1 Sources of knowledge - general analysis

In order to answer the main research question, the analysis of sources of knowledge about cryptocurrencies was carried out using frequency procedures. The results, which are presented in Figure 1, showed that popular information websites, social media, and family and friends are the sources of knowledge about cryptocurrencies for students. TV & radio and universities & schools are also sources of knowledge for some of them. Other sources are not popular and are not used so often.

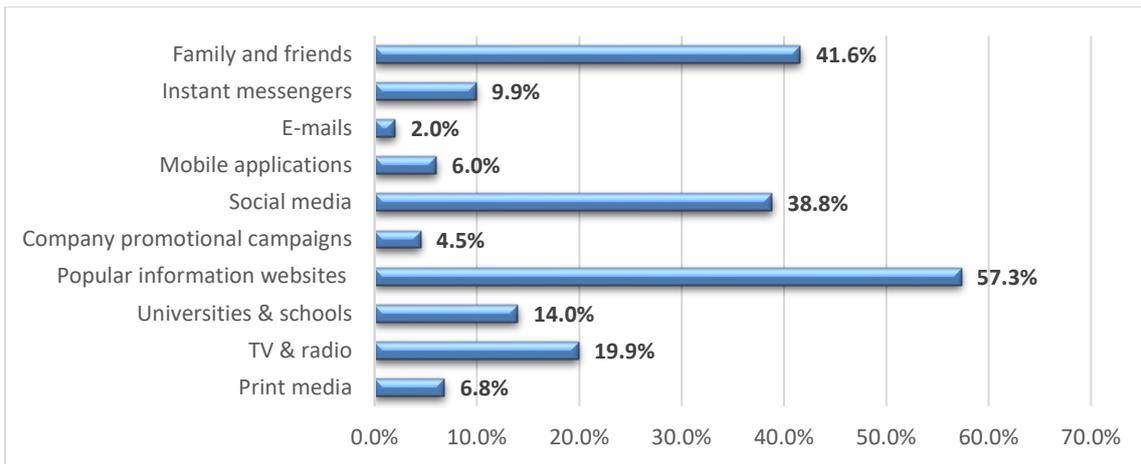


Figure 1: Sources of knowledge about cryptocurrencies for students - general outlook

Source: own elaboration.

The results presented in Figure 1 are general and embrace all survey participants. However, they have encouraged us to perform a detailed analysis of knowledge sources that are used by students classified by their chosen characteristics, i.e., gender and the university's location. This approach could bring the big picture of the problem analyzed.

4.2 Sources of knowledge about cryptocurrencies for males and females

To test hypothesis **H1** and answer **RQ1**, Chi² test was conducted for gender group comparison. The results are presented in Table 2.

Table 2: Chi² test results for gender group comparison

	Print media	TV & radio	Universities & schools	Popular information websites	Company promotional	Social media	Mobile applications	E-mails	Instant messengers	Family and friends
Z	0.222	9.511	5.727	20.557	0.242	0.002	0.082	0.572	6.196	1.722
p-value	0.638	0.002	0.0167	<0 .05	0.623	0.963	0.774	0.449	<0 .05	0.189

Source: own elaboration.

The test results presented in Table 2 show that in four cases the *p*-value is lower than 0.05. It means that there were statistically significant differences in sources of knowledge between males and females, i.e., TV&radio, universities& schools, popular information website, and instant messengers. Thus, hypothesis H1 is partially supported. To show the big picture of the problem analyzed, it was decided to show a frequency analysis of the sources of knowledge for males and females. The results are presented in Figure 2.

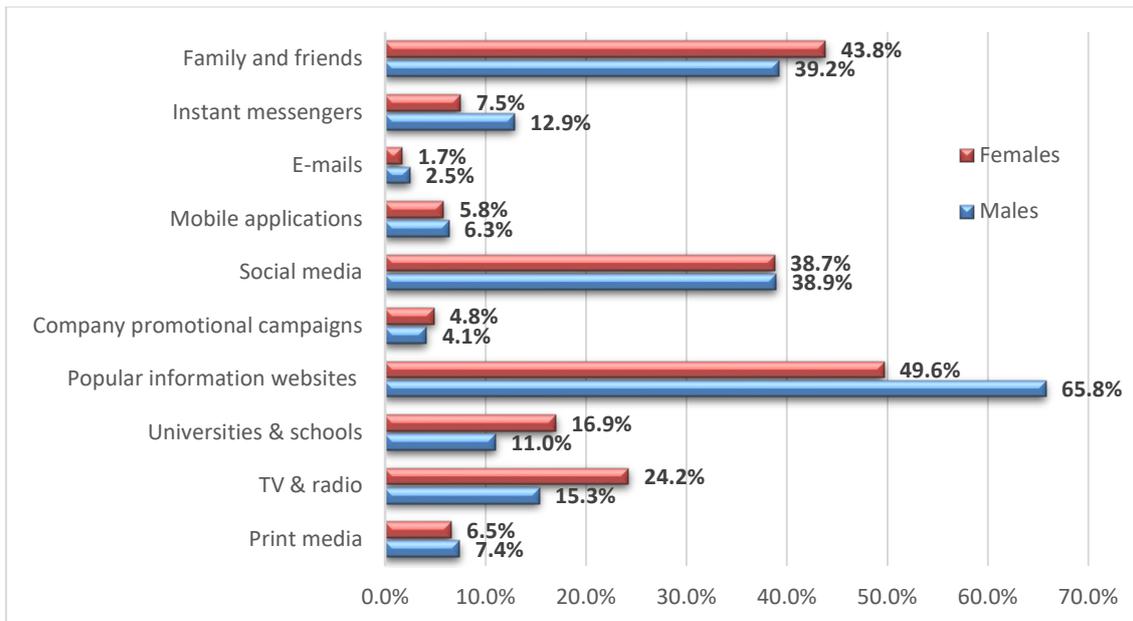


Figure 2: Sources of knowledge about cryptocurrencies for males and females

Source: own elaboration.

The results presented in Figure 2 show that popular information websites are most frequently used as a source of knowledge about cryptocurrencies followed by family and friends. As specified, popular information websites were the source of knowledge for 65.8% of males and 49.6% of females whereas family and friends were the source of knowledge for 39.2% of males and 43.8% of females. On the other hand, results for typical and well-known sources of knowledge that are TV & radio and universities & schools show that a smaller proportion of students use them. Thus, TV & radio were the source of knowledge for 24.2% of females and 15.3% of males whereas universities & schools were the source of knowledge about cryptocurrencies for 16.9% of females and 11% of males. The results show that these are less popular than websites.

4.3 Sources of knowledge about cryptocurrencies for students from two university environments

To test H2 hypothesis and answer RQ2, Chi² test was conducted for students from two university environments comparison. The results are presented in Table 3.

Table 3: Chi² test results for gender group comparison

	Print media	TV & radio	Universities & schools	Popular information websites	Company promotional	Social media	Mobile applications	E-mails	Instant messengers	Family and friends
Z	0.021	0.415	0.171	1.898	2.097	2.487	0.105	3.796	1.260	13.137
p-value	0.885	0.519	0.679	0.168	0.147	0.115	0.746	0.051	0.262	0.0003

Source: own elaboration.

The test results presented in Table 3 show that only for family and friends the p-value is lower than 0.05. It means that there were statistically significant differences in sources of knowledge for students from two university environments for this one variable exclusively. Thus, hypothesis H2 could be rejected. Nonetheless, it was decided to show a frequency analysis for the sources of knowledge for two universities. The results are presented in Figure 3.

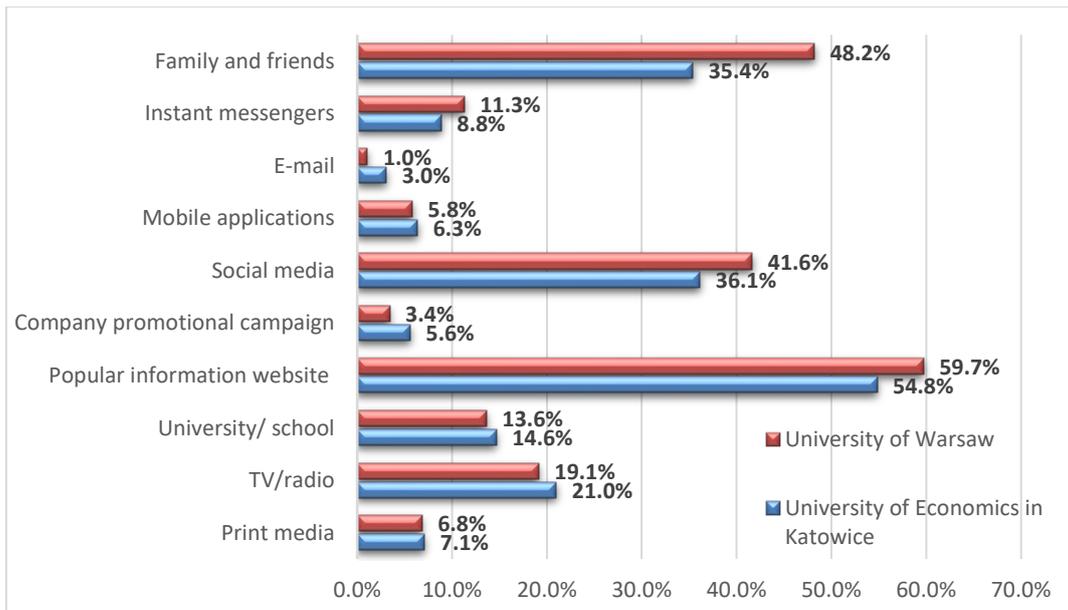


Figure 3: Sources of knowledge about cryptocurrencies for students from two university environments

Source: own elaboration.

The results presented in Figure 3 confirm that the biggest differences pertain to family and friends as the source of knowledge. Thereby, family and friends are the source of knowledge about cryptocurrencies for 48.2% of students of the University of Warsaw and for 35.4% of students of the University of Economics in Katowice. What is more, the results show that the students of the University of Warsaw slightly more frequently used social media, popular information websites, and instant messengers as the sources of knowledge about cryptocurrencies, whereas students from the University of Economics in Katowice slightly more frequently used non-ICT-related sources which are TV & radio and universities & schools. However, the differences for other than family and friends variables are small and even very small.

5. Conclusions

5.1 Research contribution

This paper contributes to extant research on the sources of knowledge for university students from Generation Z, born between 1995 and 2009 (McCrinkle & Fell, 2019), by:

- identifying specific sources of knowledge about cryptocurrencies;
- identifying and examining the differences and similarities between males and females in the sources of knowledge about cryptocurrencies;
- identifying and examining the differences and similarities between students from two university environments as to the sources of knowledge about cryptocurrencies.

To date, researchers have mainly explored the sources of knowledge for the development of products and other business-related purposes (Dost et al., 2020; Moaniba et al., 2020). From that perspective, the sources of knowledge are useful for businesses to achieve their goals. Accordingly, this study represents a worthwhile attempt to expand current understanding of the sources of knowledge on specific problems exemplified by cryptocurrencies.

Overall, this study fills the research gap by identify which sources of knowledge are used by young people while searching for specific knowledge such as cryptocurrencies. Our findings confirm the main types of sources of knowledge about cryptocurrencies. Furthermore, addressing changes in the sources of knowledge about cryptocurrencies used by males and females, we confirmed that popular information websites were most frequently used as a source of knowledge about cryptocurrencies; what is more, men used them more often than women. As to the university's environment, we revealed that no matter what the environment is, the approach of students to the sources of knowledge and the ability to use them for their own purposes are similar and no significant differences were indicated. For one variable only, i.e., family and friends, we were able to find

these differences as for students from the University of Warsaw family and friends were a more frequently used source of knowledge than for the students from Katowice. It may mean that metropolitan students are more family-minded. On the other hand, it may source from the fact that Warsaw as a city is surrounded by numerous of small cities and villages and those people do not often have other options than to study in Warsaw and, what is no less important, studying in Warsaw is seen as prestigious and sets them apart (Wasielowski, 2020; Antonowicz & Gorlewski, 2011).

Overall, the results showed that people generally choose well-known ICT, i.e., popular information websites and social media, as sources of knowledge about specific and innovative problems such as cryptocurrencies. Non-ICT related sources such as universities and schools as well as television and radio are less popular. Based on our results, e-mails and promotional campaigns of companies are the least used sources of knowledge. This may mean that neither users nor businesses are sending emails about cryptocurrencies and are unlikely to create promotional campaigns about them.

5.2 Limitations and implications

We directed our survey to young people only. Moreover, Polish students from two universities were invited to participate in our study. Although these universities differ in terms of the Polish higher education market, our results can be interpreted for Poland only, particularly to two regions, i.e. metropolitan and Silesian ones. This, however, does not close the problem and further analyzes and comparisons would be interesting e.g. for the elderly, people from different countries, with different levels of education, etc. This study may be useful to researchers. They can use our approach and develop it for other groups of respondents.

In addition, we can encourage companies to use our results as a basis when making decisions about the sources of knowledge they offer people, especially when the knowledge sources are available online. Our results show which sources are popular and which of them are used by young people while searching for information on specific problems. The results can therefore support companies in identifying which sources are worth attention, and hence in developing projects focusing on those sources.

Finally, we are aware that our paper focuses on the most popular sources of knowledge. However, these sources are constantly changing, also in terms of their popularity. This means that the sources popular today may not be as popular in the near future. On the other hand, new sources may emerge and their popularity may increase, which is difficult to identify at the moment. It also means that the idea behind this paper can be developed and reconsidered in the future according to the new trends and approaches.

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