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THE NEED FOR FINANCIAL EDUCATION IN THE FACE OF THE SOCIAL MEDIA AND CRYPTOCURRENCY PHENOMENON

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Abstract. *Purpose* – is to provide evidence of how social networks act as an indispensable channel in the cryptocurrency phenomenon and its public perception, analysing the context in which it occurs, as well as the patterns followed and the most commonly used channels.

Research methodology – this article explores and provides evidence on the relationship between cryptocurrencies and social networks through the use of digital social listening tools, exploring data retrieved from the most prominent social networks, as well as websites, forums and blogs.

Findings – the urgent need to provide an adequate level of financial education in the digital economy.

Research limitations – the study should be carried out by age segments to assess whether it is only a problem of the younger population, which are the habitual users of social networks.

Practical implications – the cryptocurrency user or investor is aware of the existing risks associated with cryptocurrencies, especially among the young population, without underestimating the influence that social networks have had and continue to have on the perception and acceptance of digital currencies, and even on their popularity.

Originality/Value – investing in cryptocurrencies requires social responsibility on the part of institutions, demanding adequate legislation and financial training for potential investors.

Keywords: cryptocurrencies, financial education, social listening, sentiment analysis, social networks.

JEL Classification: D14, D18, I21, Z13.

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1. Introduction

This article analyses the impact and growth of cryptocurrencies, as well as the links cryptocurrencies have with social networks (Poongodi et al., 2021) and the need to develop appropriate financial education in relation to these digital assets. Although the birth of Bitcoin (Nakamoto, 2008, Mai et al., 2018) was an event in that this digital currency was presented as a decentralised alternative to fiat money (Caraiani & Călin, 2018), it should be noted that cryptocurrencies emerged with the support of cryptographic techniques based on an underlying technology called block chain or blockchain, which led to a change in the way certain financial transactions could be carried out in the eyes of many users, moreover, it began to rethink the traditional concept of money (Mougayar, 2016) under the protection of certain characteristics inherent to digital currencies, such as transparency, immutability and, above all, decentralisation (Al-Shdaifat, 2023), which added and differentiated values that attracted the attention of a significant number of followers and investors.

However, the reality of cryptocurrencies today is far from their original purpose in terms of the role they play in the real economy, raising questions about their future, perhaps far from the solutions or benefits they were intended to provide, as warned by the International Monetary Fund's Allen (2022).

While it is reasonable to note that digital currencies have indeed experienced remarkable growth in terms of adoption, use, market capitalisation, valuation, negotiation and diversification (De Filippi & Loveluck, 2016; Delfabbro et al., 2021), it is no less accurate that their adoption as a means of payment is low, given the number of ATMs and companies worldwide that accept them, moving away from their original conception. It is true that at the end of 2022, Spain was positioned as one of the leading countries in terms of Bitcoin ATMs, with 283 terminals, ahead only of the United States, Canada and Australia (Coin ATM Radar, 2024). However, this number pales in comparison to the more than 53,000 traditional ATMs that will exist in Spain by the end of 2020 (ECB, 2020).

In this sense, as shown in Figure 1, cryptocurrencies are still not widely used as a means of payment for online transactions, where credit cards or PayPal prevail.

Mastercard's New Payments Index 2022 ranks Europe as the region in the world least likely to adopt new digital payments, a fact that, according to the survey conducted to prepare this report, is due to concerns about security and a general lack of knowledge about how to buy or hold cryptocurrencies, data that is also consistent with the results obtained in countries such as Uruguay, where 83% of respondents say they would use cryptocurrencies if they understood the system better (Hyman, 2022).

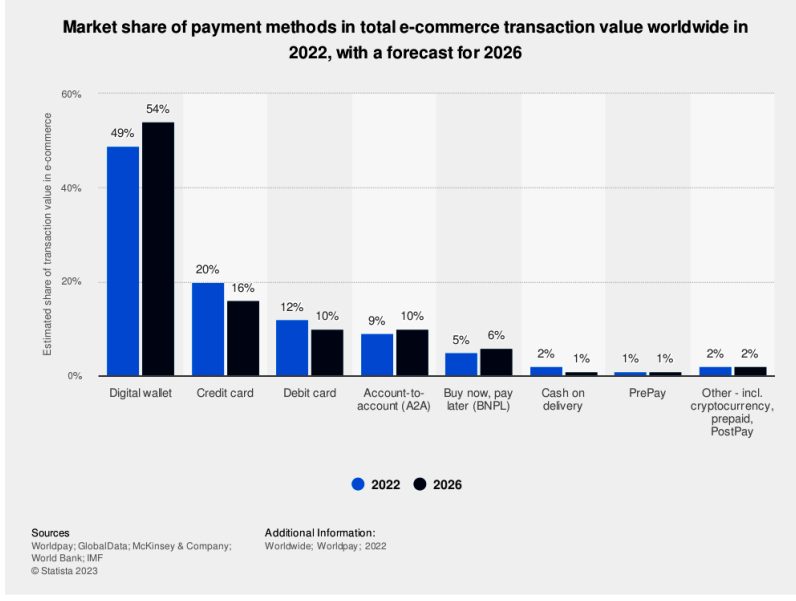

Figure 1. Market share of payment methods in total e-commerce transaction value worldwide in 2022, with a forecast for 2026 (Source: Worldplay & Statista, 2024).

This has led cryptocurrencies to become relevant as financial investments rather than as a means of payment, which has meant that they have a preponderance in deregulated financial markets (Zhao & Zhang, 2021). This is precisely what Lam and Lam (2017) warn of the dangers that this reality brings in terms of addiction syndromes generated in online environments, as well as the need to provide, especially for the youngest, adequate financial education to prevent this type of risk, not only due to the relative ease of access to cryptocurrencies through digital environments but also due to the extremely high volatility of cryptocurrencies, as is the case with bitcoin (Kayal & Balasubramanian, 2021), which makes investing in this type of asset extremely dangerous in terms of assuming financial risks.

As a result of this, and the subsequent popularisation of cryptocurrencies on social media platforms, the reach and influence of these would have determined the public's perception of these digital assets, thus influencing market sentiment towards them (Guégan & Renault, 2021), a fact that has manifested itself in the boom that cryptocurrencies such as Bitcoin and Ethereum have enjoyed as a result of the omnipresence of social media in today's society (Nadarajah & Chu, 2017; Zargar & Kumar, 2019; Reuters Institute, 2023).

Indeed, social networks have today become a resource for information and communication, providing access to diverse opinions and perspectives, and are often considered a barometer of public sentiment in online environments, including financial markets (Ranco et al., 2015; Santana, 2010). In this context, especially with regard to cryptocurrencies, social networks and social listening techniques can provide valuable insights into market trends, but they also represent both a challenge and a risk, as relying solely on social networks for investment decisions can compromise the quality and accuracy of information; indeed, Lazer et al. (2018) warn that social networks are highly susceptible to misinformation and manipulation, as they can distort perceptions and analysis, which cryptocurrencies, by their very nature, are not immune to.

While education from the grassroots is the most viable alternative, the results may be delayed, condemning many adults to the financial meltdown of their enthusiasm for crypto assets. For immediate purposes, and without neglecting the long term, governments must establish rules and risk management programs in cryptofinance, cushioning the use of extremely volatile assets and pressing towards collective awareness that, although the topic is attractive and promising, in-depth knowledge is required to obtain positive results.

Moreover, it is necessary to emphasie that investing in cryptocurrencies is not only influenced by public perception but also by economic, regulatory and technological factors (Aste et al., 2017), so ignoring these circumstances through a vision based solely on the information provided by social networks may lead to uninformed investments.

Recent research explores the intersection of financial literacy, social media, and cryptocurrencies (Fernández Bayo et al., 2019; Zapata-Ros, 2011). Studies highlight the need to incorporate cryptocurrency concepts, into higher education curricula to address knowledge gaps and prepare professionals for current market demands (Ordóñez Sánchez, 2021). Social media platforms, particularly YouTube and Twitter, play a crucial role in spreading cryptocurrency news to Spanish-speaking traders, who prefer alternative media sources to traditional ones (Velasco Tello, 2023). The rise of cryptocurrencies has introduced new financing possibilities for the Third Sector, and social cryptocurrencies are emerging as a

possible green and digital financing alternative (Gómez Álvarez & Luque Mateo, 2023). However, the use of cryptocurrencies raises important tax considerations that need to be addressed (Gómez Álvarez & Luque Mateo, 2023). These findings underscore the growing importance of crypto education and its impact on various sectors, from academia to finance to social organizations.

In light of the above, financial education would be crucial to develop a correct understanding of the basic financial concepts inherent to any financial asset, even more so in the case of digital currencies, so that the correct interpretation of financial information and the ability to make informed investment decisions (Huston, 2010) is of paramount importance in the context of cryptocurrencies. The curriculum in financial literacy, management, accounting, and taxation should incorporate concepts related to cryptocurrencies such as Bitcoin to prepare professionals for the current demands of the market.

To address these issues, experts suggest implementing new educational models that leverage social media platforms, influencers, and personalized content to complement formal education and attract young people's interest in financial literacy (Grandes & Colombo, 2023; Vanti & Sanz, 2015; Stolper & Walter, 2017).

2. Methodological framework

Recent research explores the intersection of social media, cryptocurrencies, and marketing strategies. Social listening on digital platforms has become crucial for organizations to reach target consumers and align with strategic marketing planning (Alanis, 2022). Cryptocurrency traders, predominantly male, prefer alternative media and social media such as YouTube and Twitter for news consumption, highlighting the need for specialized economic journalism (Velasco Tello, 2023). Companies in various sectors are incorporating cryptocurrency concepts into their marketing and advertising strategies to associate their brands with digital culture and technology (García-Estévez, 2022). Attempts have been made to predict cryptocurrency prices using social media data, particularly tweets, in combination with traditional market indicators through long-term memory neural networks (LSTMs). However, the impact of social media sentiment on price prediction remains limited, suggesting the need for more advanced natural language processing techniques (Regal et al., 2019).

Therefore, the methodology for conducting the proposed research is based on the social listening technique, which is based on monitoring social networks and the Internet, identifying and evaluating what is being said on the web and in social networks about a company, brand, product or specific topic (Codina, 2009). This process is mainly used for sentiment analysis and reputation management, but can also be used to identify trends, market research, opportunities or emerging threats (Jansen et al., 2009; Nassi-Calò, 2015; Equihua, 2016).

In this way, social listening is used extensively as a means of understanding users' perception of a particular issue or topic (Herrera et al., 2022), since it works not only with perception itself but also with any anchor point that is established between the user and the topic under study, based primarily on the use of technologies and algorithms that automatically track and collect data from various online sources: social networks, blogs, forums, news and other types of websites. Once the data is collected, it is then analysed to identify patterns,

trends and sentiments, using techniques such as natural language processing (NLP) and text analysis (Cambria, 2016).

Most social media data tends to fall into two broad groups: structured and unstructured. Structured data adheres to standardised and well-defined data formats, while unstructured data is often more difficult to process because the format is not predefined, such as a Facebook post (Hartman, 2020). Social listening platforms are used to collect, manage and analyse social media data, while social suites incorporate many of the capabilities of social technologies into a single platform and are used to perform data collection and analysis tasks (Liu & Dawson, 2021).

According to the report, "Forrester Wave: Social Listening Platforms (SLP), Q4 2020, which provides a comprehensive assessment of leading SLP vendors, the Brandwatch, Consumer Research platform used in this research is evaluated along with nine other SLP vendors (Digimind, Linkfuence, ListenFirst, Meltwater, NetBase, Quid, Sprinklr, Synthesio, Talkwalker and Zignal Labs), resulting in the platform leading the market by achieving the highest scores in the areas of strategy and market presence (Liu & Dawson, 2020).

1. The process of social network analysis is usually divided into four phases (Stieglitz et al., 2018):
2. Discovery: identification of content and its corresponding keywords, hashtags, etc., which contribute to defining the objectives of the analysis and the main hypotheses to be tested.
3. Monitoring: identifying data sources and data collection.
4. Preparation: Prepare the data for subsequent analysis.
5. Analysis: applying various analytical methods and techniques to the prepared data set in order to answer the questions posed in the discovery phase.

In this research, as shown in Figure 2, we will follow the same steps proposed by Stieglitz et al. (2018), with the addition of one that relates to subsequent implementation, understood as the need to effectively communicate the results of the social network analysis.

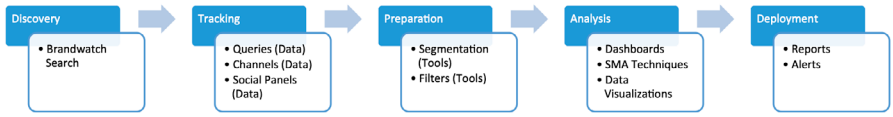

Figure 2. Assignment of the main functions of Brandwatch to the framework of the network analysis process (source: McGuirk, 2021).

The first phase of discovery will use Brandwatch Search, an artificial intelligence search engine using natural language processing (NLP) techniques. The search is linked to existing mentions in social networks and on the internet about the importance of financial education for the good management of cryptocurrencies.

In the next, subsequent phase, the so-called query is created, which refers to the set of keywords that allow information to be retrieved in the platform's systems. The aim is to obtain the broadest possible view of what is happening on the Internet and social networks thanks to digital social listening on cryptocurrencies and financial education, i.e. to know and

assess the extent of interest in financial education related to the cryptocurrency phenomenon thanks to online conversations and publications. To this end, Boolean operators were used to combine the concepts sought and to refine the results to be obtained. This allows us to obtain a test preview to immediately evaluate the type of mentions retrieved by the current query logic, favouring the intended social analysis.

In the next phase, tools will be needed to segment and filter the information obtained from this initial Boolean search preview, eliminating invalid sites not related to the research and filtering the query by language, location and date range, which in this case will be one year, in order to analyse whether the evolution of the content under study follows a certain pattern.

3. Results

After analysing the keywords and hashtags that allowed us to define the objectives to be studied, the following query was formed, as shown below:

```
((bitcoin OR Ethereum OR criptomoned*) NEAR/5 ("educación financiera" OR educa*)
) NOT blockchain
```

This query returns 1,190 mentions in the last 30 days, from 25 May to 25 June 2023, after filtering by language (Spanish) but searching globally and across Twitter, Reddit, YouTube, Facebook, Instagram, Tencent QQ, Tumblr, news, forums, reviews and internet blogs.

The code used selected Bitcoin, Ethereum and cryptocurrencies as a general term covering any meaning of the term, with a maximum distance of five words with the terms "financial education" or any of the derivatives of the word "education" thanks to the Boolean asterisk. The term blockchain was excluded in order to refine the search by supporting it with the selected cryptocurrencies, as they have a market share of 74% by capitalisation (TradingView, 2022) or any other reference to digital currencies.

The search was then extended to a full year, starting on 25 June 2022, to see how the number of mentions already reflects the reality of the chosen time horizon, in which just over 12,720 mentions were counted with 6,207 unique authors, i.e. in the case of the source being a social network, neither re-tweets nor internalisations with the original author are counted.

There is no doubt, however, that the growth of the topic under study is remarkable, as the increase is very striking both in terms of mentions (+1,129%) and unique authors (+933%), which shows that the duo of cryptocurrencies and financial education is indeed generating considerable interest on the Internet and in the social networks analysed (Figure 3).

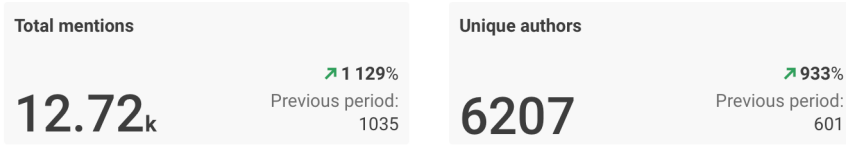

Figure 3. Total mentions and unique authors (Source: Brandwatch, n.d.)

Next, in the Figure 4, is investigated which sources were leading this social conversation and found that the social network Twitter was clearly in the lead, accounting for 85% of the volume of conversations around search over the 12 months examined in this research.

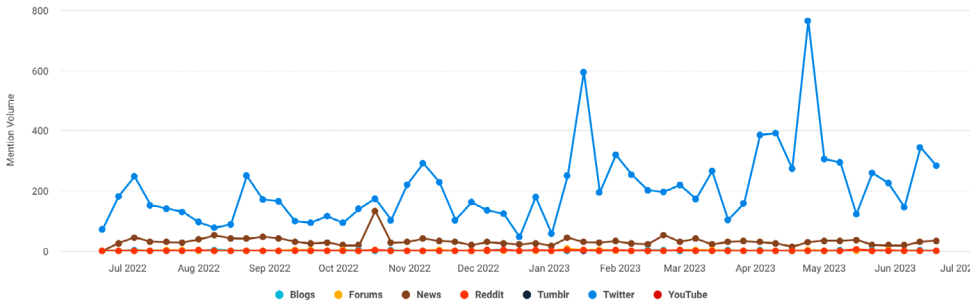

Figure 4. Media with the highest volume of mentions (Source: Brandwatch, n.d.)

However, it is also necessary to be able to analyze the key concepts or most important conversations that the query previously designed for this research yields. The objective is to corroborate whether the aforementioned query really reflects a relevant social conversation or trending topic that is aligned with the concept of financial education in the cryptocurrency environment. As can be seen in the following graph 4, the trending topics are closely related to our research, which shows that in fact not only has there been an increase in the level of conversations and interaction with them, but also demonstrates that once the sample of 12,720 total mentions in a year has been analyzed, they are closely related to the object of this research (Figure 5).

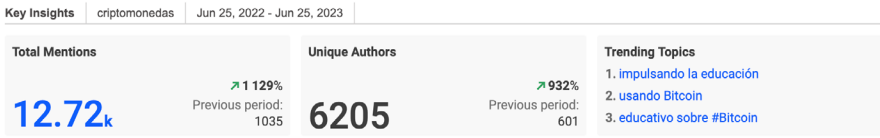

Figure 5. Trending topics (source: Brandwatch, n.d.)

Once the main topics have been analysed, it is particularly interesting to be able to deduce which keywords are driving these conversations, in order to better understand what is underlying each conversation. To do this, we decided to use word cloud technology, which not only extracts the keywords in the conversations, but also identifies those that have an increasing trend on the right-hand side of the lower horizontal axis, and those that have a decreasing trend on the left-hand side of the same lower horizontal axis.

The following Figure 6 shows how the tag "#bitcoin where it is most needed" is the most prominent, not being in itself relevant to the subject of the research, so it has been chosen to analyse the words or groups of keywords that follow it in terms of their increasing trend, clearly finding here several references that fully affect the purpose of the research. Thus, it is possible to highlight how, in the cryptocurrency environment and especially around bitcoin, "adoption and education", "financial education in #bitcoin", "educating about bitcoin",

"educational content", "driving education", "educating about #bitcoin", "educational programme", "educational project", "University of Science and Technology" or "Swiss Universities" stand out. It should not be forgotten that all these keywords come from the search command itself, entered into the Brandwatch software, which forces the words Bitcoin, Ethereum or cryptocurrency to be no more than five words away from the terms education or financial education, in order to contextualise the results of this research.

Figure 6. Keyword cloud (source: Brandwatch, n.d.)

It should be noted that in order to have a complete picture of the impact of the online conversations that took place on social networks and on the Internet last year, it is extremely important to consider the feelings that they generated, which is why we have used the functionality related to sentiment analysis, since the fact that the topics analysed are relevant does not mean that they have been received by the public or the feelings that they may have generated, i.e. whether the reaction to these topics was positive, neutral or negative in terms of sentiment analysis. To do this, Brandwatch uses natural language processing (NLP) techniques to classify them as positive, neutral or negative.

Table 1 shows the ten sites that have generated the most mentions in terms of financial education in the cryptocurrency field, accounting for a total of 11,183 mentions out of the 12,720 mentions recorded in this research (second column of the table referred to), which means that these ten sites, with Twitter at the top as mentioned above, cover 87.92% of the total number of mentions.

The third, fourth and fifth columns quantitatively reflect sentiment analysis, also known as opinion mining, while the seventh column models the average impact of mentions on a logarithmic scale calculated by Brandwatch from zero to one hundred. On the other hand, yahoo.com, through its Yahoo Finance component, is able to generate the highest level of impact with a remarkable 95.8 out of 100, indicating that a generalist social network such as Twitter undoubtedly generates the highest volume of mentions but a negligible impact due to its non-specialist nature in the financial field. On the other hand, with only 0.22% of the mentions on Twitter, yahoo.com is able to generate an impact ten times greater. Finally, the same is true for the last column, which reflects reach or the number of total views, where yahoo.com again dominates with the highest value in this category.

Table 1. Sites with the highest number of mentions and sentiment (source: Brandwatch, n.d.)

	MENTIONS					IMPACT	SITE VISITORS		REACH
SITE NAME	MENTIONS	POS	NEG	NEU	QUERIES	AVERAGE	VISITORS/MONTH	TOP AUTHORS	AVERAGE
twitter.com	10 841	198	646	9 997	criptomonedas	9.4	1 414 667 000	@LaBiblioteca	2 071
criptonoticias.com	106	4	19	83	criptomonedas	28.8	447 000	Marianella Vanci	259
investing.com	74	6	12	56	criptomonedas	43.9	28 936 000	n/a	3 899
cointelegraph.com	60	2	5	53	criptomonedas	37.8	6 497 000	Joseph Hall	2 215
facebook.com	26	1	2	23	criptomonedas	16.5	4 718 864 000	Steven Zamora Entrenador Financiero	358
yahoo.com	23	0	12	11	criptomonedas	95.8	1 873 020 000	n/a	4 978
bitcointalk.org	20	1	3	16	criptomonedas	42.8	13 784 000	DdmrDdmr	3 140
steemit.com	12	4	6	2	criptomonedas	42.8	13 814 000	n/a	3 143
diariobitcoin.com	11	0	1	10	criptomonedas	26	179 000	Hannah Pérez	107
bolsamania.com	10	1	4	5	criptomonedas	34.4	1 654 000	n/a	842
Total for top sites	**11 183**	**217**	**710**	**10 256**			**8 071 862 000**		

After carrying out a descriptive analysis of the variables used for the sites with the highest number of mentions, and according to the statistics in Table 2, it can be clearly seen that the above-mentioned variables have frequency distributions with positive symmetries, that is to say, with a higher concentration of values above the mean values, while all the variables, with the exception of Reach, have leptokurtic forms, which is a clear indication that does not exempt these variables from having mean values that are relatively unstable, as indicated by the Pearson coefficients of variation (Pearson CV) with values well above 0.3 in all cases. 3 in all cases.

The correlations of the variables shown in Table 3 show an extreme dependence on the sentiment generated and the volume of mentions, which is to be expected since sentiment analysis depends on the natural language processing analysis performed on the mentions

Table 2. Descriptive statistics (source: own analysis based on Brandwatch (n.d.) data)

	Mentions	Positive	Neutral	Negative	Total Monthly Visitors	Impact	Reach
Media	1118.3000	21.7000	1025.6000	71.0000	8.0719E+08	37.8222	2101.2000
Error típico	1080.3478	19.5988	996.8580	63.9137	4.8606E+08	7.4104	534.1790
Mediana	24.5000	1.5000	19.5000	5.5000	13799E+07	36.1000	2143.0000
Moda	#N/D	1.0000	#N/D	12.0000	#N/D	#N/D	#N/D
Desviación estándar	3416.3596	61.9768	3152.3417	202.1127	1.5371E+09	23.4337	1689.2222
Varianza de la muestra	11671512.6778	3841.1222	9937258.2667	40849.5556	2.3625E+18	549.1364	2853471.5111
Curtosis	9.9976	9.9722	9.9980	9.9787	4.9824	4.4807	–1.1130
Coeficiente de asimetría	3.1618	3.1563	3.1619	3.1577	2.2081	1.7303	0.29%
Rango	10831.0000	198.0000	9995.0000	645.0000	4.7187E+09	86.3934	4871.0000
Mínimo	10.0000	0.0000	2.0000	1.0000	1.7900E+05	9.4066	107.0000
Máximo	10841.0000	198.0000	9997.0000	646.0000	4.7189E+09	95.8000	4978.0000
Suma	11183.0000	217.0000	10256.0000	710.0000	8.0719E+09	378.2219	21012.0000
CV Pearson	3.0550	2.8561	3.0737	2.8467	1.9042	0.6196	0.8039
Total valores	10	10	10	10	10	10	10

Table 3. Correlation matrix (source: own analysis based on Brandwatch (n.d.) data)

	Mentions	Positive	Neutral	Negative	Total Monthly Vsitors	Impact	Reach
Mentions	1	0.999645246	0.999998704	0.999774424	0.137080195	–0.427173696	–0.006993092
Positive	0.999645246	1	0.99961821	0.99960368	0.128210964	–0.43040051	–0.000138395
Neutral	0.999998704	0.99961821	1	0.99974059	0.137482165	–0.427741432	–0.007596992
Negaive	0.999774424	0.99960368	0.99974059	1	0.133482	–0.417178	0.000326
Total Monthly Visitors	0.137080195	0.128210964	0.137482165	0.133482	1	–0.098244	–0.119914
Impact	–0.427173696	–0.43040051	–0.427741432	–0.417178	–0.098244	1	0.759490
Reach	–0.006993092	–0.000138395	–0.007596992	0.000326	–0.119914	0.759490	1

themselves. The correlation between reach and impact is also moderately strong, with a positive value of 0.75949, but it is really weak, almost zero, with the rest of the variables, including the sentiment variables.

It should be noted that the correlations of Total Monthly Visitors are also very weak, suggesting that this variable depends on other variables not included in the analysis offered by Brandwatch.

If we now focus on the sentiment analysis of the study, it is striking that it is extremely neutral, i.e, The NLP algorithm shows that although financial education about bitcoin and cryptocurrencies has indeed generated a relevant and growing conversation, the sentiment of the audience is mostly neutral with a percentage of 91.71%, which would mean indifference or an indication that this type of audience is mostly neutral with a percentage of 91.71%, which would mean indifference or an indication that this type of audience is mostly neutral with a percentage of 91.71%. 71%, which would indicate indifference or an indication that this type of audience was indifferent, the audience sentiment was mostly neutral with a percentage of 91.71%, which would indicate indifference or an indication that this type of conversation would decline, despite the potential relevance for the reasons expressed at the beginning of the research. This is followed by negative sentiment, with 6.35%, and positive sentiment, with 1.94%.

In fact, Figure 7 below shows that two peaks of sentiment have been reached in the activity of the conversations. It should be noted that reach is measured by the number of users who have seen a given post at least once, i.e. if a person sees a post twice, the reach would be one, while the impressions would be two.

Specifically, on 7 November 2022, there was a maximum of negative sentiment with a reach of 404,437, while on 24 April 2023, there was a maximum of neutral sentiment with a reach of 1,528,122. However, as far as positive sentiment is concerned, it is noticeable that in addition to not reaching a maximum, the line is practically flat throughout the period analysed.

In addition to the sentiment generated by online publications during the period studied, it is important to know its evolution over these twelve months thanks to Figure 8, where

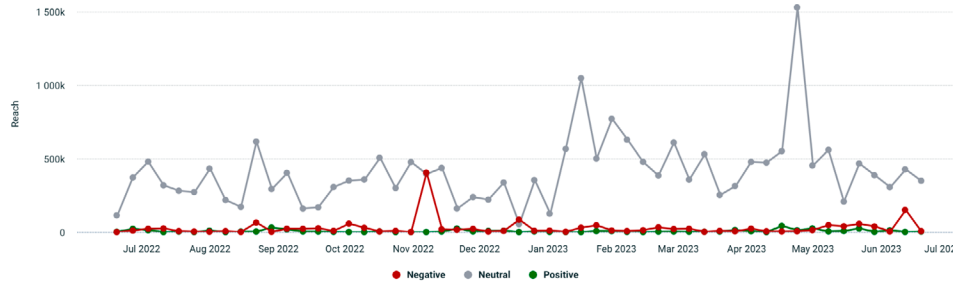

Figure 7. Evolution of sentiment (source: Brandwatch, n.d.)

it can be seen that the trend of each sentiment does nothing but continue to grow in the same direction, thus strengthening each sentiment since the neutral sentiment starts with 877 mentions and grows by 207%, the negative sentiment starts with 124 mentions and grows by 665% and finally, the positive growth, which starts with 34 mentions but grows by 803%, slightly higher than the negative sentiment. The neutral sentiment starts with 877 mentions and grows by 207%, the negative sentiment starts with 124 mentions and grows by 665% and finally the positive sentiment starts with 34 mentions but grows by 803%, slightly higher than the negative sentiment, which shows that the changes in the perception of conversations focused on financial education in cryptocurrencies have not undergone major changes in terms of the sentiment generated in the audience, since although they have increased in volume, the perception has not changed to a great extent.

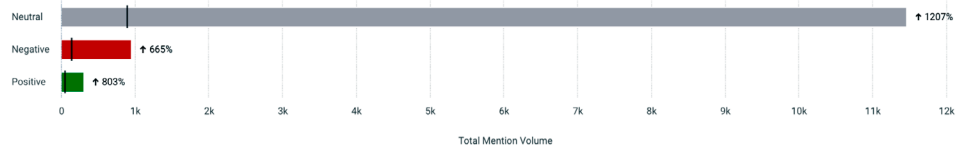

Figure 8. Evolution of sentiment (source: Brandwatch, n.d.)

No less interesting is the fact that the type of sentiment generated depends on the platform on which the online conversation takes place, since although the consolidated results do not vary, there are differences depending on where the conversations originate. As shown in Figure 9, YouTube and Reddit are the most polarising platforms, with YouTube generating the highest level of positive sentiment and the second highest level of positive sentiment, while Reddit generates the highest level of negative sentiment and the third highest level of positive sentiment. Twitter, the leader in terms of conversation volume and reach, is the least polarising in terms of generating sentiment in its digital conversations, with the lowest levels of both negative and positive sentiment.

In this research we have also proceeded to geolocate where the greatest activity has taken place thanks to the query proposed, highlighting here Colombia with the first and third maximum on 1 August 2022 and 24 April 2023 respectively, with reaches of 287,545 and 727,278 as shown in graph 9. While, on the other hand, El Salvador marks the second maximum on 7 November 2022, it is worth drawing attention precisely to this maximum, as

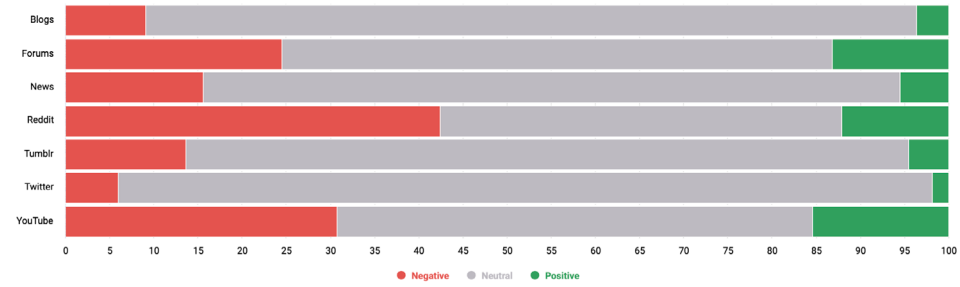

Figure 9. Sentiment by platform (source: Brandwatch, n.d.)

it coincides with that of the same date in terms of negative sentiment, while, on the other hand, the other maximum in neutral sentiment measurement that occurred on 24 April 2023 also coincides with that of the maximum reach in Colombia (Figure 10).

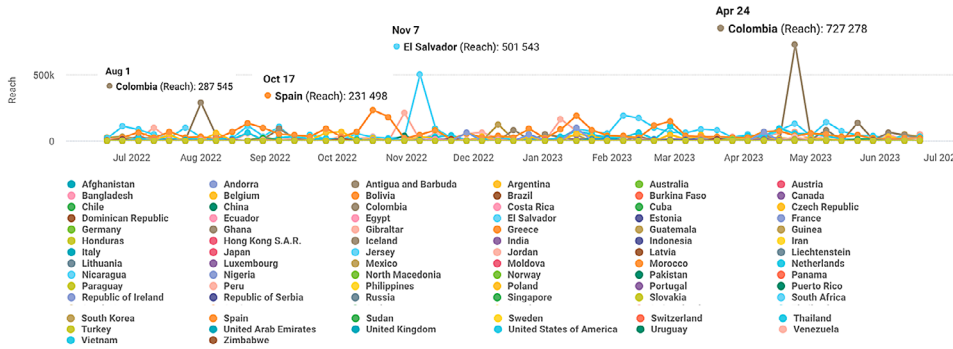

Figure 10. Reach by country (Source: Brandwatch, n.d.)

In terms of demographics, participation in online conversations related to this research, as shown in Figure 11, shows a clear predominance of male authors, with peaks at various points in time, as can be seen, and a fairly clear trend over time.

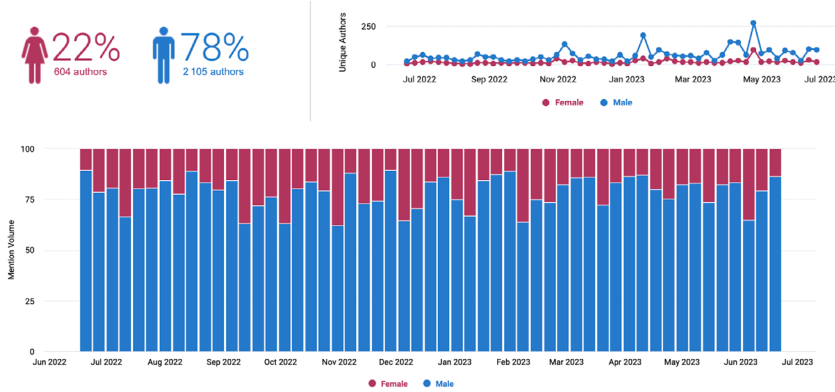

Figure 11. Demographic breakdown (source: Brandwatch, n.d.)

4. Conclusions

There is growing concern about cryptocurrencies as an asset to invest in without adequate financial education. This has been demonstrated quantitatively, as shown by the data on the increase in mentions on networks compared to the previous period, 1,129%, with Twitter being the network leading these conversations.

However, it should be noted that in the sentiment analysis study, financial education on bitcoin and cryptocurrencies continues to generate a largely neutral sentiment with 91.7%, which means that although the number of mentions has increased, there is still a more than marked indifference towards bitcoin and cryptocurrencies on the part of social network and internet users, which is closely linked to the risks that cryptocurrencies, as a highly volatile financial asset, pose to any potential investor, especially if they lack adequate financial education.

It is worth noting that generalist social networks such as Twitter undoubtedly lead in terms of volume of mentions due to their own digital ubiquity, user volume and openness to conversations on almost any topic. However, their level of impact is inversely proportional to the volume generated, with financial sites clearly having the greatest impact, meaning that the volume of conversation taking place on the more generalist networks runs a high risk of being diluted by the very nature of the medium in which it takes place.

It is therefore necessary to propose an appropriate digital communication strategy if the aim is to ensure that the level of financial literacy is disseminated in order to contribute to the knowledge of basic but necessary financial terms, especially among the younger population, who generally use social networks to stay informed, which undoubtedly entails risks of misinformation, bias or special interests.

It is striking that the presence of key institutions in financial education is practically non-existent in terms of volume of mentions, impact and scope, referring as key institutions to those emanating from governments, central banks and financial institutions, which undoubtedly play a crucial role in the socio-economic aspects of any state or nation.

For this reason, the institutions themselves must assess this reality and propose accurate strategies in terms of effectiveness and digital efficiency, aimed at raising awareness in terms of having an adequate level of financial education in digital environments, but above all to avoid situations of misinformation or information bias arising from conversations or digital content, which can lead to potential risks around cryptocurrencies.

Adequate financial information reduces and minimises social differences while undoubtedly contributing to the intellectual wealth of any society, so the potential of social networks and the internet must undoubtedly be correctly calibrated in order to take advantage of their potential and quasi-ubiquity in a responsible manner.

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