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IV. FINANCE AND INVESTMENT: NEW CHALLENGES AND OPPORTUNITIES *https://vilniustech.lt/bm*

INVESTIGATION OF SENTIMENT IN THE GREEN TRANSFORMATION OF CRYPTOCURRENCIES

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Abstract. Cryptocurrencies are associated with a pressing problem for society – electricity consumption. This problem is particularly relevant when electricity is used from nonrenewable sources. Cryptocurrencies have investment potential but due to the environmental impact, sustainability-minded investors may refrain from investing in this asset. The main purpose of this paper is to identify the sentiment in the green transformation of cryptocurrencies. Cryptocurrency communities, which consist of investors, cryptocurrency developers or enthusiasts interested in this asset, often appear on the Internet or on various social media. Users share information and express their opinions on the trends of the cryptocurrency market on various social platforms. This study uses sentiment analysis to identify the sentiment of existing or prospective users in the green transformation of cryptocurrencies. The results of this study contribute to research that helps investors predict trends in the cryptocurrency market when making investment decisions. The methods of this study are the analysis of the scientific literature and the analysis of sentiment using Matlab software.

Keywords: sustainability, green cryptocurrencies, sentiment analysis, social media, investment potential.

JEL Classification: G41.

1. Introduction

Cryptocurrencies have investment potential but due to the environmental impact, sustainability-minded investors may refrain from investing in this asset. The complex mechanisms of blockchain and mining consume high amounts of electricity and increase the environmental footprint of the production of electronic waste (Ali et al., 2024). With growing concerns about saving the planet, investors and policy makers are considering and deepening their understanding of green financial instruments (Husain et al., 2023). The growing cryptocurrency market is also very sensitive to environmental concerns (Ali et al., 2024). Interest in sustainable investment has increased, and investors are looking for financial instruments that complement their environmental values (Husain et al., 2023). For example, cryptocurrencies using the Proof of Stake (PoS) system consume much less energy than cryptocurrencies using the Proof of Work (PoW) system, but it is not clear whether a specific cryptocurrency is greener than others based on a single element – PoW or PoS (Ali et al., 2024).

Research on cryptocurrencies in the context of sustainability is just beginning. Ali et al. (2024) investigate green cryptocurrencies and portfolio diversification. Ali et al. (2024) note that their study opens up new research directions by taking into account green cryptocurrencies (efficient in energy). Husain et al. (2023) test for the dynamic connection of green cryptocurrencies with other assets.

Ciganovic and D'Amario (2023) note that the cryptocurrency market is young, traditional news outlets are often unable to keep up with events, making social media the main source of information for cryptocurrency investors. Currently, cryptocurrency-related social media activity is a widely researched area. (Koszewski et al., 2024). In the scientific literature, one of the most popular and often used social media to source information about cryptocurrencies is Reddit (Bowden & Gemayel, 2022; Burnie & Yilmaz, 2019; Ciganovic & D'Amario, 2023; Jung et al., 2023; Koszewski et al., 2024).

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In the new procedure for selecting green cryptocurrencies presented by Ali et al. (2024), one of the stages is the media attention. In the selection procedure proposed by Ali et al. (2024), one of the stages of the selection of green cryptocurrency is the evaluation of the selected cryptocurrency on social media. The chosen cryptocurrency must be considered more sustainable, energy efficient, clean or green on social media than their counterparts (Ali et al., 2024). Based on this suggested selection procedure, the sentiment about green cryptocurrencies on Reddit social media was chosen to analyse in this study. Reddit was chosen for the study due to its popularity in cryptocurrency research, and according to Burnie and Yilmaz (2019) this social media provides full access to the submitted texts.

The novelty of this research is that it invastigates the sentiment towards green cryptocurrencies. Prior studies on sustainability and green cryptocurrencies examine the price dynamics of green cryptocurrencies with other assets Husain et al. (2023) and portfolio diversification involving green cryptocurrencies (Ali et al., 2024). Miśkiewicz et al. (2022) analyse the links between crypto transactions, economic development, renewable energy consumption, and environmental degradation. This study was directed to identify sentiment in the green transformation of cryptocurrencies. Green finance can be an incentive to combat pollution and achieve green transformation of the economy and to promote the implementation of targets for carbon peaking and carbon neutrality (Zhang et al., 2023). Green transformation is a movement from pollution industries to cleaner and green industries (Tong et al., 2020). The importance of green finance development is reflected not only in the protection of the environment, but also in the effectiveness of green finance to support the real economy (Zhang et al., 2023). In this context, cryptocurrency research becomes especially important to sustain the cryptocurrency market during the green transformation period.

The results of this study contribute to research that helps investors predict trends in the cryptocurrency market when making investment decisions.

Research problem. Is there a positive sentiment for the green transformation of cryptocurrencies?

Research objects. Sentiment to cryptocurrencies.

Purpose of the paper. Identification of the sentiment in the green transformation of cryptocurrencies.

Tasks of the research:

1. To analyse the theoretical aspects of sentiment in the green transformation of cryptocurrencies;
2. To prepare the research methodology;
3. To study the sentiment in the green transformation of cryptocurrencies.

Research methods. Scientific literature analysis and sentiment analysis using Matlab software.

Research limitations. Reddit was chosen as the social network for the study. The posts used for sentiment analysis were from 2023-11-30 to 2024-02-26.

2. Theoretical aspects of sentiment in the green transformation of cryptocurrencies

Research on cryptocurrencies can be divided into three parts. One part of the research could be defined as evaluating cryptocurrencies from an investment perspective: benefits and risks. Another part of the research is related to the field of behavioural finance. The research raises the very important question of what influences investors' choice to invest in cryptocurrencies, since cryptocurrencies have no underlying assets and their prices depend on investors' future expectations. The third part could be distinguished as the research on cryptocurrencies in the context of sustainability. However, these studies are still in their early stages.

2.1. The impact of sentiment on cryptocurrencies

Research that is related to behavioural finance investigates rational and irrational investor behaviour. Traditional economic theory says that investors are rational (Anamika et al., 2023). It claims that the market is efficient and that asset prices reflect all information (Anamika et al., 2023). Given the absence of quantitative financial basic information and historical precedents for pricing behaviour, the role of public sentiment in traders' decision making may be more pronounced in cryptoasset markets (Bowden & Gemayel, 2022). Behavioural economic research has shown that investors are not completely rational, so asset prices are affected by their emotions and beliefs (Anamika et al., 2023). Part of the value of cryptocurrencies comes from the effort and work people put into creating a new coin, but researchers have not reached a consensus on other factors that affect the price of cryptocurrencies (Zhang & Zhang, 2022).

The predictions based on sentiment analysis did not differ significantly from the predictions based on historical data, but compared to the stock market, the accuracy of trend predictions with sentiment analysis was on average much higher for cryptocurrencies (Tollo et al., 2023).

Cryptocurrencies are relatively young, very volatile and are frequently exposed to shocks (Anamika et al., 2023). The cryptocurrency market develops in a shorter time than other financial markets and most cryptocurrencies do not survive more than 10 years but grow rapidly (Jia et al., 2022). Cryptocurrencies are now recognised as assets and laws and financial regulations are beginning to support their practical use (Jung et al., 2023). Also, cryptocurrencies have created enormous debates and enthusiasm in recent years and public discourse has been dominated by bubble stories, anarchism, human interest stories, and fears of inequality (Bowden & Gemayel, 2022). Makurin et al. (2023) note that there are disputes over the recognition and status of cryptocurrencies, the legalisation of such payment methods.

Research on cryptocurrencies in the field of behavioural finance shows that investors in cryptocurrencies are influenced by sentiment and characterised by irrationality. Anamika et al. (2023) discovered that Sentix's Bitcoin sentiment has a positive impact on the Bitcoin returns and Ethereum, Ripple, Litecoin, and Bitcoin cash returns are significantly affected by the sentiment of Bitcoin. Tollo et al. (2023) studied the predictive powers of short-term social media sentiments on stock and cryptocurrency markets and found that cryptocurrencies are far more predictable. Ciganovic and D'Amario (2023) found that sentiment and attention measures contribute significantly to better mean directional accuracy (MDA) results for mid-cap and small-cap cryptocurrencies, but have no effect on large-cap cryptocurrencies and stocks. Ciganovic and D&Amario (2023) used Twitter and Reddit for sentiment analyses. Jung et al. (2023) found that using three platforms LexisNexis, Web of Science and Reddit with Bitcoin queries could provide understanding of cryptocurrency sentiment.

Jia et al. (2022) investigated the influence of an irrational factor, namely investor sentiment, on herding and found strong evidence that herding behaviour is related to investor sentiment. The research results of Zhang and Zhang (2022) showed that the impacts of the sentiments of the tweets on the return and the trading volume are largely driven by the incremental change in the sentiments. Bowden and Gemayel (2022) analysed the sentiment of cryptocurrency communities on Reddit and a dataset of more than two million cryptocurrency transactions and found that sentiment plays an important role in investment decisions. For example, it has been found that traders can get a positive return when the sentiment toward cryptocurrencies is particularly positive, and performance can react to positive changes in the online sentiment (Bowden & Gemayel, 2022).

A search of the Scopus database with the keywords "cryptocurrenc*" and "sentiment" yielded 398 published publications from 2014 to 2023. Using the VOSviewer programme, a network visualisation map of the keywords in these publications was compiled, which is presented in Figure 1.

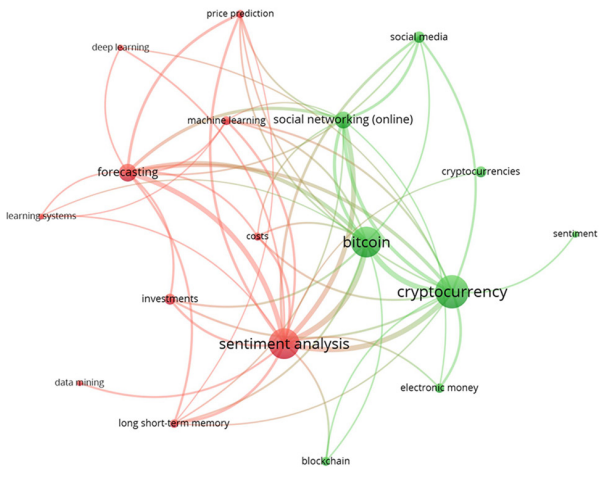

Figure 1. Visualisation with the keywords "cryptocurrenc*" and "sentiment" (source: compiled by the authors)

The visualisation map shows that cryptocurrency is associated with social networking (online), forecasting, price prediction and sentiment analysis (Figure 1). It can also be seen that the cryptocurrency and bitcoin nodes are almost similar in size. Bitcoin is the first cryptocurrency by capitalisation and Aliu et al. (2022) note that this cryptocurrency remains a leader in the crypto market and influences prices and the volume of transactions in other digital currencies.

In summary, it can be said that recent studies show that sentiment impacts cryptocurrencies, but it is also important to note that little research has yet been done on the sentiment of cryptocurrencies.

2.2. Green cryptocurrencies

Currently, cryptocurrencies are especially associated with a pressing problem for society – high electricity consumption. Energy consumption is one of the main factors determining the green side of crypto as a popular currency (Sori et al., 2021). This criticism is especially strong for Bitcoin. One Bitcoin transaction consumes 2143.01 kWh, equivalent to an average of 73.45 days of energy consumption in a home and emits 1017.93 kg of CO_2 (Pham et al., 2022). This is mainly true when mining processes use electricity from nonrenewable sources (Yan et al., 2022). If we want to use cryptocurrencies as global technologies for everyday use in the future, it is important to optimise these areas and take into account energy efficiency and sustainability (Sori et al., 2021). Cryptocurrencies have the necessary investment potential, but they have a negative impact on the environment, so many institutions with strict sustainability policies and ecological goals generally avoid investing in this digital asset (Yan et al., 2022). The growing concern about the environmental impact of the cryptocurrency market has led to the creation of a new class of sustainable cryptocurrencies that are energy efficient and aims to incorporate renewable energy into mining processes.

Too much energy consumption from PoW creates challenges in the cryptocurrency community, and the phenomenon of more and more energy use of Bitcoin is getting worse (Sori et al., 2021). Bitcoin and other cryptography uses Proof of Work (PoW) mechanisms to ensure network security and stability (Sori et al., 2021). Bitcoin uses huge amounts of energy through the Proof of Work (PoW) mechanism (Sori et al., 2021). Ethereum, like most cryptocurrencies, is based on a computational competition called Proof of Work (PoW) (Fairley, 2019). In order to reduce energy consumption, it is planned to replace Ethereum Proof of Work (PoW) with Proof of Stake (PoS), which, according to Buterin, will reduce energy consumption per Ethereum transaction by more than a hundred times (Fairley, 2019). The main technological approaches and environmental effects during cryptocurrency mining should be studied, as mining is a

process of creating new coins and consumes considerable resources. (Makurin, 2023).

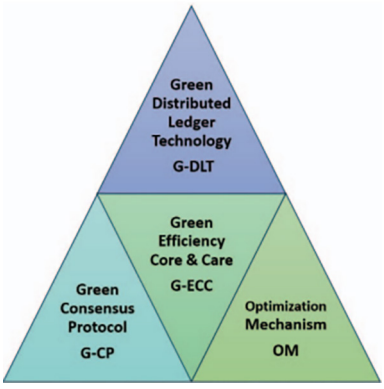

Figure 2. Cryptocurrencies green efficiency model (source: Sori et al. 2021)

Research proposing criteria, selection models or algorithms for green cryptocurrencies has only just begun. Therefore, it is still unclear what characteristics a cryptocurrency should have in order for it to meet the principles of sustainability. In the scientific literature, Sori et al. (2021) proposed one of the cryptocurrency valuation models with the aim of achieving green efficiency, which is presented in Figure 2.

Sori et al. (2021) note that the research has not yet been completed, it has a macro view of the green quality model proposed for the cryptocurrency domain. Ali et al. (2024) considering the growing attention for green cryptocurrencies proposed a four-step systematic screening process to select green cryptocurrency, which is presented in Figure 3. The new sample selection procedure shows that it will be selected if all four steps favour cryptocurrency (Ali et al., 2024).

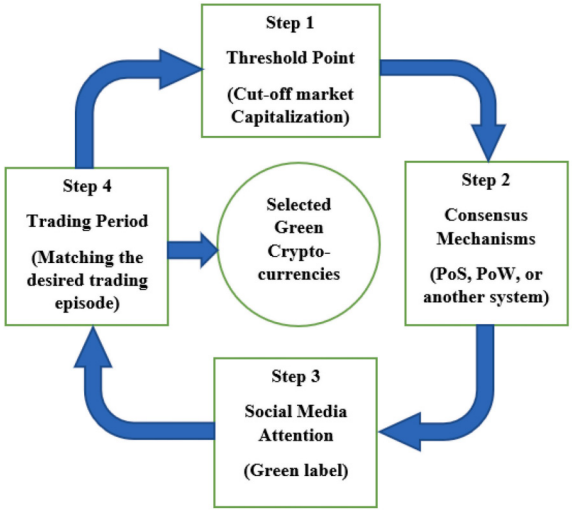

Figure 3. New selection procedures for green cryptocurrencies (source: Ali et al., 2024)

In summary, cryptocurrencies have only begun their journey towards sustainability. There is still much research to be done and many changes to be initiated. Pham et al. (2022) argue that more efforts should be made to raise environmental awareness among cryptocurrency founders, which could lead to a technological shift in crypto markets toward greener, lower-carbon algorithms. Also, it can be noted that algorithms of cryptocurrencies are gradually becoming more low-carbon and environmentally friendly and are increasingly favoured by environmental investors (Shao et al., 2023).

2.3. Green transformation

The preservation of the sustainability of natural environments has become a major focus of global policy agendas (Khan et al., 2024). Transformation to low-carbon energy sources is particularly necessary to ensure the sustainability of financial and economic systems (Yan et al., 2022). Green transformation, including energy transformation, has become an important strategy for global sustainable development and environmental governance (Zhai et al., 2022). Discussions about innovations that help to decouple economic growth and environmental degradation or promote the transition from a brown economy to a green economy are becoming increasingly relevant in the academic and business worlds, stimulating a stream of research that is very interesting in terms of its economic, environmental and social impact (Passaro et al., 2023). The "brown economy" is full of energy consumption and pollution, causing many social, economic and environmental problems (Zhai et al., 2022). With the increase in financial incentives and regulatory pressure to reduce carbon emissions, companies are investing increasingly in research and development to develop cleaner technologies and processes (Gong et al., 2024).

As environmental emissions increase, more investment in green finance is required and green finance has some control over emissions (T. Zhang & Zhao, 2024). Green finance and social integration influence the growth of green economics through different channels (Han & Gao, 2024). Green finance is a potential stimulus for combining economic growth with environmental responsibility, including investments, financial instruments and regulations that emphasise environmentally friendly companies (Mehmood & Kaewsaengon, 2024). Green financing mechanisms can increase market transparency and accessibility of environmentally friendly projects (Han & Gao, 2024). Gong et al. (2024) describe green finance as a beacon of hope in a world striving for sustainability, where financial growth and environmental responsibility go hand in hand. One of the most important impacts of green finance is the potential for global carbon reduction (Gong et al., 2024).

Support for a greener path to energy, which helps our lives, businesses and investments, has received a lot of attention and influence in all markets, and the crypto market is no exception (Ali et al., 2024). Yan et al. (2022) note that new technologies have a positive impact on reducing the total carbon footprint, however some innovations, including cryptocurrencies, can lead to environmental degradation. Against the background of low-carbon

technology development, policymakers should pay attention to this change and actively promote the environmental awareness of the cryptocurrency industry, such as creating a more convenient trading environment for non-Proof of Work (non-PoW) cryptocurrencies or imposing a carbon tax on high-volume cryptocurrencies (Shao et al., 2023).

In summary, it is important to note that the preservation of the sustainability of the natural environment is currently one of the most important aspirations and that the transition to low-carbon energy sources is inevitable. Cryptocurrencies will also need to adapt during this green transformation period.

3. Methodology

The purpose of this research is to identify the sentiment in the green transformation of cryptocurrencies. The methodology of this study is based on sentiment analysis. Matlab software is used to perform sentiment analysis. This sentiment analysis scheme is shown in Figure 4.

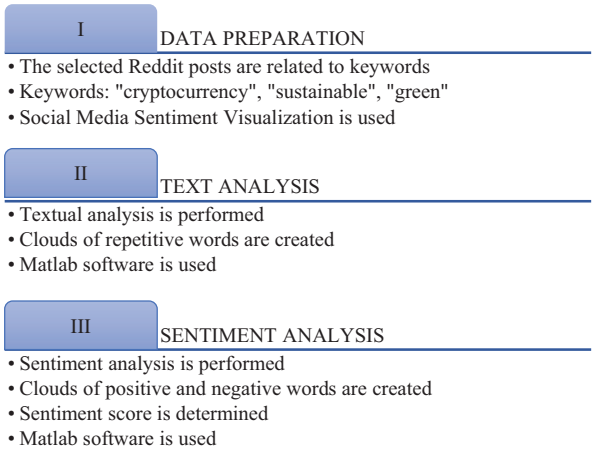

Figure 4. Sentiment analysis scheme
(source: compiled by the authors)

The first part of this research covers the preparation of data for sentiment analysis. As previously mentioned, Reddit is chosen for this study due to its popularity among the cryptocurrency community, as well as its popularity in sentiment research and also it provides full access to the submitted texts. This research uses texts posted on Reddit. This online social network allows users to upload short text messages, links, images and videos (Social Media Sentiment Visualization App, n.d.). Every day, millions of people around the world write, vote and comment on communities based on their interests Homepage – Reddit, 2024). Such a site can serve more as a way of informal communication (Social Media Sentiment Visualization App, n.d.). For this research, Reddit posts related to selected keywords are selected using the Social Media Sentiment Visualization App (n.d.).

The second part of this research covers a textual analysis of the data that was prepared in the first part. It is analysed which words are repeated the most. At this part, clouds of repeated words are created. In this part of the research, Matlab software with MathWorks code is used for data processing. The first MathWorks code is used to analyse the most repeated words and create clouds of these words (MATLAB Wordcloud – MathWorks, 2024).

The third part of this research covers a sentiment analysis of the data prepared in the first part. Positive and negative words are identified. Clouds of positive and negative words are created from the same data. Based on these data, the sentiment score is determined. In this part Matlab software with MathWorks code is also used for data processing. The second MathWorks code is used to analyse the positive and negative words, create clouds of these words and determine the sentiment score (Train a Sentiment Classifier – MATLAB & Simulink, n.d.). The sentiment score above 0 represents positive sentiment, the score below 0 represents negative sentiment, and the score close to 0 represents neutral sentiment (Train a Sentiment Classifier – MATLAB & Simulink, n.d.).

After summarising the sentiment analysis data, it will be possible to identify sentiment in the green transformation of cryptocurrencies and answer the question raised at the beginning of the research, is there a positive sentiment for the green transformation of cryptocurrencies.

4. The results of sentiment analysis in the green transformation of cryptocurrencies

As mentioned previously, the first part of this research covers data preparation for Reddit sentiment analysis using the Social Media Sentiment Visualization App. Keywords to search for posts were used: "cryptocurrency" AND "green"; "cryptocurrency" AND "sustainable". Received data "cryptocurrency" AND "green": 1316 posts from 2023-11-30 to 2024-02-26. Received data "cryptocurrency" AND "sustainable": 1229 posts from 2024-01-26 to 2024-02-26.

In the second part of this research, a textual analysis of the data that was prepared in the first part was performed. The results of the performed textual analysis are presented in Figures 5 and 6.

Figure 5 shows the most recurring words in Reddit posts for the keywords "cryptocurrency" and "green". The most repeated words were found: "casino" – 1020, "games" – 844, "crypto" – 790, "Bitcoin" – 609,

Figure 5. Textual analysis with keywords "cryptocurrency" AND "green" (source: compiled by the authors)

"cryptocurrency" – 515, "market" – 511. Also often repeated words found: "Ethereum", "green", "blockchain", "price", "security", "investment".

Figure 6 shows the most recurring words in Reddit posts for the keywords "cryptocurrency" and "sustainable". The most repeated words were found: "crypto" – 714, "cryptocurrency" – 697, "market" – 592, "OFFER" – 590, "token" – 546, "gaming" – 417, "Bitcoin" – 409, "blockchain" – 407, "community" – 405, "new" – 336, "technology" – 329, "investment" – 319. Also often repeated words found: "Ethereum", "future", "sustainable", "investors", "price".

Figure 6. Textual analysis with keywords "cryptocurrency" AND "sustainable" (source: compiled by the authors)

In the second part of this research a sentiment analysis of the data that was prepared in the first part was performed. Positive and negative sentiment was identified after loading dictionaries of positive and negative words into the Matlab software at this stage of the study. In this way, the sentiments related to the words occurring in the text are classified. The identified clouds of positive and negative words are presented in Figures 7 and 8.

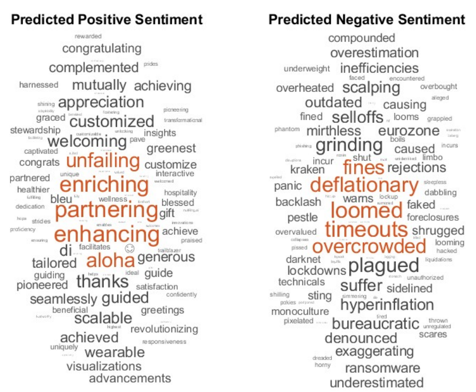

Figure 7. Sentiment analysis with keywords "cryptocurrency" AND "green" (source: compiled by the authors)

Figure 7 shows the most recurring positive and negative words in Reddit posts for the keywords "cryptocurrency" and "green". The most repeated positive words were found: "unfailing", "enriching", "enhancing", "achieving", "appreciation".

The most repeated negative words were found: "fines", "deflationary", "overcrowded", "hyperinflation", "overestimation", "underestimated" and "inefficiencies".

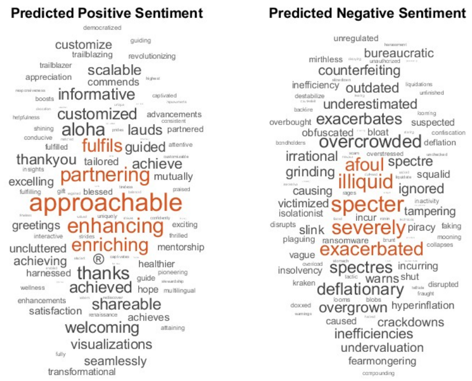

Figure 8. Sentiment analysis with keywords "cryptocurrency" AND "sustainable" (source: compiled by the authors)

Figure 8 shows the most recurring positive and negative words in Reddit posts for the keywords "cryptocurrency" and "sustainable". The most repeated positive words were found: "partnering", "approachable", "enhancing", "enriching", "shareable".

The most repeated negative words were "illiquid", "severely", "deflationary", "overgrown", "hyperinflation", "inefficiencies" and "undervaluation".

```
ans =

  1316×2 table

      Var1

    -0.42227     "[r/CryptoDailyTLDR] [Thu, Nov 30 2023] TL;DR —
     0.35454     "com/u/Loprovow) **Some help withdrawing from Bit
    -0.40016     "com/u/RossoneriEA) **Charlie Munger Meme Coin Pu
   -0.032199     "guccounter=1&guce_referrer=aHR0cHM6Ly9vdXQucmVkZ
      0.4551     "com/u/hurkerlurker) **Do I need to download the
     0.50696     "com/u/EuivIsMyLife) **How do you identify if a c
     0.19702     "com/r/SatoshiStreetBets/comments/186z31r/heres_m
   -0.093069     "com/cristiano-ronaldo-faces-legal-firestorm-for-

         :

     0.47221     "The minimum deposit required is $55, and Netelle
     0.31699     "You need to deposit $20 or more to qualify, and
      0.3435     "**$25 Live Betting Free Play** For the first-eve
      0.2671     "**20% Monthly Reload Bonus** Regular casino play
     0.56523     "For roulette, the prizes are $300, $200, and $10
      1.7508     "Plus, you can get started with a $1,000 welcome
     0.49022     "[r/CryptoCurrency] Hitachi issues Japan's larges
     0.53184     "[r/CryptoCurrencyClassic] Hitachi issues Japan's
```

Figure 9. Sentiment score with keywords "cryptocurrency" AND "green" (source: compiled by the authors)

At the end of the sentiment analysis, the sentiment score is determined with Matlab software and MathWorks code. To find the sentiment score, the sentiment score of each word in the texts and the average sentiment score were calculated (Train a Sentiment Classifier – MATLAB & Simulink, n.d.). The sentiment scores are presented in Figures 9 and 10.

The variation of sentiment scores, which indicates positive or negative posts with keywords "cryptocurrency" and "green", is from –1.01 to 1.95. The

average sentiment score of Reddit posts with keywords "cryptocurrency" and "green" is 0.56. As mentioned before, the sentiment score above 0 represents positive sentiment, the score below 0 represents negative sentiment, and the score close to 0 represents neutral sentiment (Train a Sentiment Classifier – MATLAB & Simulink, n.d.). Based on this received average of sentiment score result, it can be said that the sentiment of analysed posts with keywords "cryptocurrency" and "green" is positive.

The variation of sentiment scores, which indicates positive or negative posts with keywords "cryptocurrency" and "sustainable" is from –1.00 to 2.94. The average sentiment score of Reddit posts with keywords "cryptocurrency" and "sustainable" is 0.81. In this case, the average sentiment score is also above 0. Based on this received average of sentiment score result, it can be said that the sentiment of analysed posts with keywords "cryptocurrency" and "sustainable" is positive.

```
ans =

  1229×2 table

     Var1
   _______    ____________________________________________

   0.37132    "[r/GrimaceArbitrum] grimace up: Grimace Coin: Es
   0.71332    "Partnerships and Ecosystem: Grimace Coin activel
    1.4334    "[r/u_Electrumkoin] Electrumkoin: Forging a Globa
    2.0501    "**Conclusion:** Join Electrumkoin in revolutioni
    1.2854    "[r/pooolse_community] Affiliate opportunity with
   0.69231    "[COME HERE](https://app.pooolse.com/join/587) **
    1.2854    "[r/ReferalLinks] Affiliate opportunity with a Bi
    1.3545    "**Real values, real bonuses** The value of your
   0.69231    "[COME HERE](https://app.pooolse.com/join/587) **

      :

    1.2079    "Based on community feedback plus assessments of
   0.68002    "# Does every Canadian casino here accept cryptoc
   0.95159    "[r/CryptoMoonInvestors] Pig Bushing ($PB) | Next
     1.405    "The selling fee is 12%, including an additional
   0.62887    "The innovative approach and excellent tokenomics
    0.8091    "[r/CryptoMoonShots] IDO | Mollars | ERC-20 | Dec
   0.70319    "The estimated listing day price is approximately
    0.8018    "For those seeking further information, here are
   0.65898    "This post is not financial advice. It is my opir
```

Figure 10. Sentiment score with keywords "cryptocurrency" AND "sustainable" (source: compiled by the authors)

In summarising the research results, it can be said that Reddit posts related to cryptocurrencies can also have links with the keywords "green" and "sustainable". Reddit posts with related keywords "cryptocurrency" and "sustainable" were identified more than posts with the keywords "cryptocurrency" and "green". The textual analysis of the filtered posts showed that cryptocurrencies are currently not so strongly associated with topics of green transformation or sustainability. This statement is based on the fact that keywords such as "green" or "sustainable" were not among the most frequently used keywords and users are more interested in other topics (casino, games). After identifying positive and negative sentiment in the filtered Reddit posts using the keywords "cryptocurrency", "green", "sustainable", a sentiment score indicating a positive sentiment was found.

5. Conclusions

After analysing the scientific literature and summarising the impact of sentiment on cryptocurrencies, it can be said that sentiment affects cryptocurrencies, but few studies have been conducted yet. Topics analysed in the literature related to sustainability or green transformation are also associated with cryptocurrencies. It is important to note that cryptocurrencies have only just begun their journey towards sustainability, thus much research is still needed to make this journey a success.

After analysing the literature, it can be said that the method of sentiment analysis is popular in the study of cryptocurrencies. Due to the large amount of posts on social media, Matlab software was chosen to process the data for this study, using publicly available MathWorks codes used in sentiment analysis. The chosen methodology made it possible to identify sentiment in the green transformation of cryptocurrencies and answer the question raised at the beginning of the investigation.

Based on the results of this research, it can be said that cryptocurrencies are currently not so strongly associated with topics of green transformation or sustainability. This statement is based on the fact that keywords such as "green" or "sustainable" were not among the most frequently used. More Reddit posts related to the keywords "cryptocurrency" and "sustainable" were found than posts related to the keywords "cryptocurrency" and "green". As expected, one of the most commonly used words is Bitcoin. Ethereum is also found, though not so often. The posts related to the Ethereum cryptocurrency and sustainability would be interesting to analyse in future research, as it is planned to reduce the energy costs of this cryptocurrency by changing the technology.

After identifying positive and negative sentiment in Reddit posts related to keywords "cryptocurrency", "green", "sustainable", average sentiment scores indicating positive sentiment were found. Based on these results, it could be said that a positive sentiment on the green transformation of cryptocurrency has been found. However, it is important to emphasise that this study has limitations such as research time and social networks. The posts from the Reddit social network from 2023-11-30 to 2024-02-26 were used to conduct the research. In the future, more research on individual cryptocurrencies in the context of sustainability would be useful.

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