BLOCKCHAIN-BASED COMPANIES' USE OF SOCIAL MEDIA TO RAISE CLIMATE CRISIS AWARENESS: CONTENT ANALYSIS OF SINGLE EARTH TWITTER ACCOUNT

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Abstract

This study aims to explore how blockchain-based companies leverage social media to raise awareness about the climate crisis and combat its effects. To address these questions, the study first discusses the utilisation of blockchain technology in the fight against the climate crisis, as well as how Single Earth, a specific blockchain-based company, raises climate awareness on social media, specifically on Twitter (now marketed as X). The research focuses on analysing the content of 295 tweets shared by Single Earth in 2022-3, and the collected data is analysed using MAXQDA and Microsoft Excel. The analysis of the Twitter content reveals the company's strong emphasis on promoting climate-related information and encouraging the adoption of greentech solutions. This research contributes to a better understanding of how blockchain-based companies utilise social media platforms to foster climate awareness and advocate for greentech initiatives.

Introduction

Increasing greenhouse gas emissions, deforestation, and the rapid depletion of natural resources, among other anthropogenic activities, pose a serious threat to the Earth's ecosystem. Finding ways to leverage technology to solve these severe global problems, which are a significant cause for concern, has become an important research topic. Within this framework, although the use of blockchain has predominantly been highlighted in fintech over the past decade, interest in blockchain technology to combat the climate crisis is growing day by day.

The use of blockchain can indeed facilitate several measures in addressing the global issue, including improving corporate accountability, establishing networks that involve all societal stakeholders, tracking and reporting real-time ecological footprint data across supply chains, and monitoring and verifying energy

production, consumption, and carbon emissions (European Commission, 2022; Chen, 2018).

The applications of blockchain technology and the pace of its adoption still evolve. However, it is believed that blockchain can play a crucial role in addressing the climate crisis due to its potential benefits and various applications. The adoption and support of this technology in combating the climate crisis are also critical for issues such as social transformation and employment. This study aims to explore how blockchain-based greentech companies use social media to raise awareness about climate change. Additionally, it discusses the types of content categories (educational, promotional, etc.) these companies use more frequently on social media, the specific goals of raising awareness, and the hashtags utilised to reach a wider audience. To answer these questions, this study reports on a content analysis of 295 tweets shared by Single Earth, a blockchain-based company that tokenises the ecological value of lands and aims to preserve biodiversity.

Leveraging Blockchain Technology in Combating Climate Crisis

Blockchain technology is commonly defined as a technology that enables secure and accessible digital transactions to take place through a peer-to-peer (P2P) distributed ledger, without the need for approval or permission from a central authority. This technology has the potential to be utilised in various fields, ranging from healthcare to education, and can also be leveraged to address the challenges posed by the climate crisis.

Bada et al. (2021) argue that blockchain technology promotes the adoption of renewable (green) energy sources in power generation and distribution by facilitating peer-to-peer (P2P) energy trading between energy producers and consumers. In addition to energy production processes, blockchain is also utilised for monitoring waste management processes and enhancing transparency in waste flows. It is further employed to improve the efficiency of waste management and increase recycling rates. Furthermore, the application of blockchain technology in forestry and other natural resource sectors for monitoring and verifying compliance with sustainability standards contributes to the reduction of illegal logging, species extinction, and illicit activities (Pal et al., 2022). Additionally, carbon credits can be recorded as assets on a blockchain network, enabling real-time and transparent tracking of carbon footprints.

Howson (2020) draws attention to the use of blockchain to monitor and manage energy production and consumption, promoting the efficient use of renewable energy sources by creating distributed energy networks. Blockchain-based solutions are being developed for traceability of natural resources, verification of compliance with sustainability standards, and supply chain management.

However, the use of blockchain technology in tackling the climate crisis is still under development. In addition to the positive practices in which blockchain is used, there are also concerns and limitations to this technology. For example, among the current challenges such as data storage and legitimacy, sustainability, which is frequently emphasised in the fight against the climate crisis, is a matter of debate due to the large energy consumption that results from the decentralisation feature of blockchain being processed by each element in the node (Hassani et al., 2019, pp. 30- 34).

In other words, transparency, reliability, traceability, verifiability, data sharing, collaboration, green finance, and innovation are seen as positive features in the use of blockchain technology (Di Pierro, 2017). On the other hand, high energy consumption, scalability problems, legal and regulatory issues, and technological compatibility raise questions about blockchain technology. These positive features and limitations reflect the potential of blockchain technology in tackling the climate crisis and the challenges to be considered (Parmentola et al., 2022; Schinckus, 2020; Aithal & Aithal, 2016; De Vries, 2018; Gupta et al., 2021). With the development and improvements of technology, negative practices can be reduced while positive practices can be further strengthened.

The Role of Blockchain-Based Companies on Climate Crisis Awareness

The fact that blockchain-based companies offer solutions for climate crisis awareness is closely related to the increasing popularity of blockchain technology through cryptocurrencies. Although the first blockchain application, Bitcoin, was developed in 2009, the emergence of blockchain-based companies for climate crisis awareness only took place a few years later. From 2015 onwards, there has been greater discussion and awareness of the potential of blockchain technology in tackling the climate crisis. It was during this period that some companies started to offer blockchain-based solutions to the climate crisis. In particular, blockchain-based projects have been developed in areas such as carbon monitoring and carbon trading, renewable energy, resource tracking, and sustainable supply chain management (Howson, 2020).

In the early days of blockchain technology, companies operating in this space often emerged as pioneering and innovative start-ups. However, over time, large organizations and industry leaders have also started to develop blockchain-based climate crisis solutions. In recent years, many companies have focused on raising awareness and providing sustainability solutions by using blockchain technology in the fight against the climate crisis (Iravani et al., 2017; Schulz and Feist, 2021).

The activities and solutions of blockchain-based companies for climate crisis awareness are accepted as a process that develops in parallel with technology (Ali

et al., 2020. In this context, the concept of green technology is a very important issue. The main purpose of green technology is to make environmentally friendly innovations to protect people's interests. Therefore, the aim of green technology is to meet the needs of society in a way that causes no toxic or adverse effects on the environment. However, there are many criticisms of green technology. The most common of these is greenwashing (Torelli et al., 2020). Greenwashing is defined as presenting a product, brand or institution as if it is environmentalist, making misleading advertisements with unfounded environmental claims, and including these claims in marketing communication activities and even on product packaging. At this point, it is important to understand what it means to be greentech. Greentech covers all sub-titles such as integration with the natural environment, competence, efficiency, fairness, full cost calculation, communication, participation, common sense and flexibility in connection with sustainability. The most well-known blockchain-based greentech companies for climate crisis awareness are companies such as Power Ledger, CarbonX, Climatecoin, Provenance, WePower and Single.Earth (Aktas, 2022). It works with a system that connects nature and economy by using big data and artificial intelligence-based methods (Single.Earth, (2023).

The Role of Social Media in Promoting Climate Crisis Awareness

Considering the role of social media in raising awareness about the climate crisis, news, reports, and information regarding the climate crisis are rapidly disseminated to a large number of users through social media. Social media tools facilitate the organisation of climate crisis awareness campaigns and events, effectively increasing awareness through hashtag campaigns, content sharing, videos, and visuals. Social media platforms effectively depict the impacts of climate change, fostering emotional connections through compelling infographics and documentaries. Through activism, individuals can voice their concerns to governments, international business owners, and political actors, advocating against the climate crisis, establishing anti-eco-massacre communities, and fostering collective action (Kunelius & Roosvall, 2021; Becken et al., 2021; Parry & Poland, 2019).

However, social media also has limitations. Issues such as misinformation, the rapid spread of false information, and limited online activism can hinder the effectiveness of social media in addressing the climate crisis. Consequently, it is essential to verify sources, seek reliable information, and carry out actual actions in the real world alongside social media engagement.

Methodology

This study examines the content (tweets, retweets, replies) shared on Twitter (currently branded as "X") by Single Earth, a company using blockchain technology, to assess the blockchain-based companies' efforts to raise awareness about the climate crisis on social media. It employs content analysis techniques that provide replicable and valid inferences to generate new insights and acquire information about practical actions (Krippendorff, 2018).

The research is limited to the company's Twitter profile as it allows both the use of ecological and political content in agenda setting (Erben, 2019) and the public interaction of Single Earth with its stakeholders. A total of 295 tweets providing comprehensive data regarding the company's activities and agenda were collected from @SingleEarth1 between August 16, 2022, and February 23, 2023, through vicinitas.io. The collected data were subsequently analysed using MAXQDA and Microsoft Excel.

The coding of the tweets (content) was conducted by two researchers working together, and any coding differences were resolved through consensus reached through discussions. Initially, draft themes were created, and the tweets were coded based on the media type, basic content type using keywords, target URL, cross-posting, call to action, hashtags, and the type of tweets that received responses. The themes were then reorganised considering the research questions, and some sub-themes were created to establish relationships between the themes (e.g., the relationship between target URLs and cross-posting codes). Each tweet was coded to include at least one theme and multiple themes could be assigned to each tweet. Therefore, there may be a discrepancy between the total number of tweets in the frequency tables and the total number of tweets coded (295). Figure 1 illustrates the process of determining themes and sub-themes, providing an example of how data analysis is conducted within the context of environmental communication. Through a systematic approach, themes are identified based on recurring topics or concepts present in the data, while sub-themes further categorize and refine these overarching themes into more specific components. This figure visually depicts the hierarchical structure of themes and sub-themes, showcasing how they are organized and interconnected. By following this methodology, researchers and practitioners can gain a comprehensive understanding of the underlying patterns and trends in environmental discourse, facilitating more informed decision-making and targeted communication strategies.

Figure 1

Example of determining themes and sub-themes
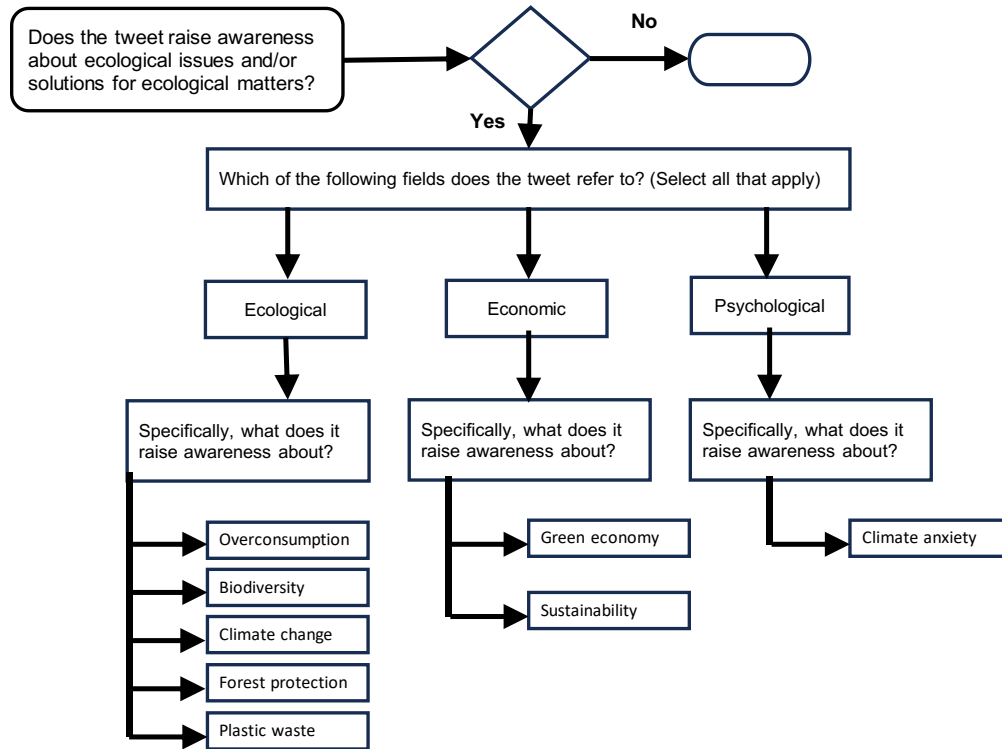
Note. The figure was created based on the thematic flowchart from the study conducted by Cavazos-Rehg et al. (2019) on tweet content analysis.

Grouping the content shared by blockchain-based companies that prioritise nature preservation on their social media accounts helps facilitate understanding their purpose of social media usage. Six main themes were obtained by coding the tweets, as shown in Table 1 for Single Earth's content.

Table 1

Definitions of Content Themes

Theme	Definition	Sample Tweet
Educational content about technology	Educational content that enables the audience to understand and embrace the technologies used and developed by the company is included in this category.	Company representatives, are you ready to take your company's ESG strategy to the next level? "Fighting biodiversity loss as part of your company ESG strategy" 📅 18.01 2-3pm CET 📍 register for the link: https://t.co/cTk84IpnCk #ESG #Sustainability
Events	This category includes announcements, information, and updates related to the company's involvement in diverse online/offline events. These events cover a broad spectrum, including AMAs, webinars, conferences, technology events, competitions, competition nominations, tech-summits.	Now is a great time for a refresher! Take a look at our AMA recap and find answers to all sorts of questions regarding MERIT tokens 🤴 #SingleEarth #MERITtoken #TechForGood #ActOnClimate https://t.co/GVKCleiuOc
Cross-posting	The content in this category is created to enhance engagement and attract more followers to the company's other social media accounts.	In @NatureBacked podcast episode "Death of the Client" @virki speaks with @mrmacleod on why it is critical for the environment, #sustainability and the #CircularEconomy to design the end of the consumer experience. https://t.co/FGqXDbhUuS #Engineering #climatechange https://t.co/OpsViBM52t
Raising awareness	This category encompasses the content shared by the company on topics such as the climate crisis, climate change, forest conservation, and nature preservation.	Humanity lives off 1.75 Earths. We need to cap our consumption to how much nature can handle. Without nature, we can't survive. Share it. Let's raise awareness. 🌍 Let's take action. #climateaction #climateactionnow #biodiversity #greeneconomy https://t.co/BbzozVppT5

Theme	Definition	Sample Tweet
Increasing engagement	These are the contents created by the company to increase engagement with its followers, business partners, affiliated organisations, and promote its team. They include content related to special occasions, job postings, and aim to foster interaction.	Thanks for featuring us in the article @AccelerationEc1, we're happy to see more talks of climate protection in the web3 space! https://t.co/xX1yeGpoMO #Sustainability #forest
Promoting company token (MERIT)	This category includes tweets shared by the company to promote, popularise, and market its own token called MERIT. It encompasses content aimed at increasing awareness and adoption of MERIT, including MERIT giveaway events.	MERIT is a possibility for individuals to create (and drive!) societal and economic change — if enough people take action, companies, and governments need to follow. Let's turn climate change and biodiversity loss around: https://t.co/0aUABU8XcX https://t.co/d5PpZRZKE6

Table 2 presents an analysis of the various frames utilized by the Single Earth company in its efforts to raise awareness about environmental issues. Frames refer to the specific perspectives or angles through which information is presented to shape public understanding and perception. In this table, different frames employed by Single Earth, such as scientific evidence, human impact narratives, solutions-oriented approaches, and urgency messaging, are outlined and categorized. This analysis provides valuable insights into the company's communication strategies aimed at effectively conveying the importance of environmental awareness and action to its audience. By examining the use of different frames, stakeholders can gain a deeper understanding of how Single Earth seeks to engage and mobilize individuals towards addressing environmental challenges.

Table 2

Raising Awareness Frames

Theme	Definition	Sample Tweet
Climate anxiety (Emotional/psychological)	Tweets aimed at raising awareness about concerns related to the climate crisis.	🌱 How do handle climate anxiety 🌱 What to expect of COP27 🌱 Beehero's unique insight into hives & much more on the new NatureBacked episode with Itamar Weizman of Firstime https://t.co/jKS9wxncFi
Green economy (Economic)	Tweets that raise awareness by focusing on nature preservation or ecological issues rather than economic benefits in relation to the green economy.	It's a start, a strong one. Now, more than ever, all parts have to work together to halt biodiversity loss. Join us in transforming into a green economy. 🌍 @CBD_COP15 @UNbiodiversity #COP15 #COP15Announcement #GBFAdoption https://t.co/TEdjo1SaAT
Sustainability (Ecological/Economic)	Tweets posted to create and increase awareness about sustainable living and economy.	Are you taking daily actions to be more sustainable?
Overconsumption (Ecological)	Tweets aimed at raising awareness about overconsumption within the framework of eco-destruction.	Saving up to cover one's needs is reasonable. Yet massive sales campaigns, like Black Friday, can lead to overconsumption and impulsive buying. It shows the refusal to understand that natural resources are limited. ⚠️ #GreenFriday #BlackFriday https://t.co/6gxkn6ly5e
Biodiversity (Ecological)	Tweets aimed at raising awareness about the decrease in biodiversity, which is one of the company's main areas of interest and business.	Humankind is finally acknowledging that nature loss poses direct and immediate risks to the global economy and financial system while also magnifying climate risks. Climate change and biodiversity loss are deeply interrelated, not separate problems. #COP15 #biodiversity

Theme	Definition	Sample Tweet
Climate change (Ecological)	Tweets aimed at raising awareness about the climate crisis and climate change.	Did you know about the Yale Climate Opinion Maps 2021? Recommend taking a look! "how Americans' climate change beliefs, risk perceptions, and policy support vary at the state, congressional district, metro area, and county levels" @Yale #ClimateCrisis https://t.co/RO7x2VVeuY
Forest protection (Ecological)	Tweets specifically raising awareness about deforestation and forest conservation.	👎🟫 Protecting forests to allow companies to emit CO2 👍🟫 Protecting forests to protect forests
Plastics (Ecological)	Tweets specifically raising awareness about the damage caused by plastic waste to nature.	More on #PlasticWaste in our @NatureBacked podcast - Check out new episode where @virki talks with John Felts from @CruzFoam #startups #innovation #environment #savingoceans https://t.co/y0N2zdrF7G https://t.co/bmeWFhoDRQ

Table 3 presents an analysis of posts categorized by content types. Each post shared by the Single Earth company is categorized into different content categories, such as awareness-raising, promotional, educational, and engagement-focused. This table provides insights into the distribution of content types within the company's social media activities, shedding light on its strategic focus areas and communication objectives. By examining the distribution of posts across these categories, stakeholders can better understand the company's efforts in addressing climate issues, promoting sustainability, and engaging with its audience effectively.

Table 3

Posts by Content Categories

Theme	N	%
Educational content about technology	36	12
Events	46	16
Cross-posting	51 (Single Earth blog n: 22, Discord channel n: 2, Nature-backed podcast n: 13, Company LinkedIn profile n: 7, Spotify n: 5, YouTube channel n: 2)	17
Raising awareness	161	55
Increasing engagement	17 (Replies n: 16, job posting n: 1)	6
Promoting company token (MERIT)	37 (Promotional MERIT tweets n: 31, MERIT giveaway posts n: 6)	13

More than half (55%) of the 295 posts (including own tweets, retweets, and replies) shared by Single Earth are dedicated to raising awareness about climate change and related issues (refer to Table 4). This is followed by cross-posting tweets, accounting for 17%, and tweets about events, comprising 16%.

Table 4

Raising Awareness Frames

Theme	N (%)	Sample Tweet
Climate anxiety (Emotional/psychological)	2 (0.67%)	🌱 How do handle climate anxiety 🌱 What to expect of COP27 🌱 Beehero's unique insight into hives & much more on the new NatureBacked episode with Itamar Weizman of Firstime https://t.co/jKS9wxncFi
Green economy (Economic)	29 (10%)	Do you know what nature-backed economy is? #economy #TechForGood
Sustainability (Economic+ecological)	6 (2%)	Are you taking daily actions to be more sustainable?

Theme	N (%)	Sample Tweet
Overconsumption (Ecological)	11 (4%)	● Black Friday? I'm not buying it. ● This is a list of tips we made for Black Friday to raise awareness of conscious consumerism, but it's really credible all year round. Share it. Use the tips. Let's make a difference. & do you have any more tips? #GreenFriday #sustainable https://t.co/vqpDhs95jm
Biodiversity (Ecological)	39 (13%)	Climate change is a known threat, but #BiodiversityLoss is much less talked about. Yet they both threaten humankind's survival on Earth. We're thrilled to introduce the excellent work (in progress) of our science team: https://t.co/pRrORebLBb @VanShaya @arildodias_eco
Nature preservation (Ecological)	18 (6%)	🌲Our interview #1 of 2022 🎉 "Listen to how @MeritValdsalu and her team are creating an economy that rewards landowners for preserving nature." https://t.co/xruTyrweYA #NordicFintechMagazine #ClimateAction #Sustainability https://t.co/keGD8QddVx
Climate change (Ecological)	33 (11%)	"There is no waste in nature - that's a manmade construct," says Joanne Rodriguez, founder of @mycocycle "And so, looking for solutions in nature to solve these problems is critical to how we battle this climate change." New ep of @Naturebacked: https://t.co/qxDeY92kbU @virki
Forest protection (Ecological)	19 (6%)	➡️ Just 28% of forests globally are in very good health. Source: Ecosystem Integrity Index by @SingleEarth1 https://t.co/d3NgImGq3X

Theme	N (%)	Sample Tweet
Plastics (Ecological)	3 (1%)	More on #PlasticWaste in our @NatureBacked podcast - Check out new episode where @virki talks with John Felts from @CruzFoam #startups #innovation #environment #savingoceans https://t.co/y0N2zdrF7G https://t.co/bmeWFhoDRQ

The analysed tweets of Single Earth aimed at raising awareness in three specific areas: economic, ecological, and psychological. Although there is some overlap in these three areas in certain tweets, as evidenced in Table 4, there are distinct domains where each framework prominently emerges. Biodiversity and climate change themes are the most prominent areas for raising awareness. However, it is worth noting that climate anxiety is the least addressed issue, with only two posts dedicated to this particular topic.

Table 5 reveals that Single Earth generated 77% of the 295 analysed tweets. This significant portion includes tweets shared from the company's public profile. Additionally, 10% of the tweets analysed were responses to other user profiles.

Table 5

Tweet Type

Theme	N (%)
Tweet	189 (64%)
Reply to others	29 (10%)
Reply to self	9 (3%)
Retweet	68 (23%)

Hashtags play a crucial role in classifying the topics and events that Twitter users are interested in, thus enhancing the accessibility of relevant content. While coding the tweets, at least one code was created for the hashtags in all 295 examined posts. However, it is important to note that only the hashtags found within the content produced by Single Earth (tweets and replies) are included in the hashtag cloud. Thus, a more specific frame was obtained regarding the interests of the audience targeted by the company. Figure 2 highlights several prominent hashtags related to

climate issues, namely #climateaction, #climateactionnow, #sustainability, #actonclimate, and #climatecrisis.

Figure 2

Hashtag Cloud

Discussion and Conclusion

This research on how blockchain-based companies utilise social media to raise awareness about the climate crisis and its effects analyses the Twitter content (including tweets, retweets, and replies) shared by Single Earth, a blockchain-based company, to evaluate its endeavours in leveraging social media to raise awareness about the climate crisis among blockchain companies. The noteworthy findings of the research can be listed as follows:

1. Single Earth company primarily focuses its posts (tweets, retweets, and replies) on raising awareness about climate issues. This observation aligns with the statement found on the company's website: "On a mission to incorporate nature conservation into everyday life to tackle climate change and biodiversity loss" (Single Earth, 2023).

2. Tweets have included podcasts, articles supported by scientific data from various news websites, and blog posts to increase awareness. Scientific studies are frequently referenced, indicating a scientific and educational approach towards nature preservation and raising awareness.

3. In addition, educational content regarding greentech is an important aspect. The adoption of greentech by stakeholders not only enhances the profitability of companies like Single Earth but also strategically positions them at an advantage.

4. The company's direct interaction with its followers appears to be limited, with a greater focus on event organisers and company executives engaging with international organisations through retweets. This approach may be seen as business-friendly, as it fosters collaboration with farmers.

5. Biodiversity and climate change are key focal points in the company's mission, as they prioritise raising awareness about these issues. While not being a non-governmental organisation, the company also endeavours to raise awareness about the green economy. However, it is worth noting that they have relatively minimal engagement with topics such as climate migration and climate anxiety, which are prominent discussions within the context of the climate crisis.

Thus, the company's primary focus is to engage users interested in the climate crisis and sustainability, with a particular emphasis on achieving climate action objectives. In its social media efforts, the company frequently employs the hashtag #techforgood to attract individuals interested in the intersection of technology and climate action. Additionally, the company actively promotes its own product, the token called MERIT, utilising the hashtag #merit through various promotional activities.

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