Information Behavior and Digital Activism: A netnographic Analysis of Women's Environmental Advocacy Networks on DOUYIN

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Abstract

In recent years, there has been a growing influence of social media. It has heightened the need to understand the way through which digital platforms such as DOUYIN facilitate information sharing and activism, particularly within the women's environmental advocacy networks. For this purpose, the present study aimed to explore the information behavior and digital activism. To conduct this study, a netnography approach was implemented to assess the women's environmental advocacy networks on DOUYIN. For this purpose, both qualitative and quantitative methods of data collection were leveraged. Data was collected through web scraping and assessed by utilizing the tools such as Atlas TI for qualitative coding and various statistical techniques for engagement metrics. It also involved social network analysis to assess influencers and network dynamics. Results showed significant engagement variations among DOUYIN accounts with verified account generally exhibiting lower engagement rates as compared to the non-verified accounts. Hashtags such as #woemenempowerment and #female leader demonstrated greater centrality metrics. Practically, the findings underscore the importance of focusing on impactful hashtags and community engagement strategies to enhance the effectiveness of digital activism. The study also contributes towards theoretical understanding of information behavior by highlighting how digital activism shapes and reflect community engagement.

Keywords

Digital Activism, Environment Advocacy, Netnographic Approach, DOUYIN.

1. Introduction

Internet has enabled more individuals to actively stand up for a cause (**Ghobadi; Sonenshein**, 2024; **Herawati *et al.***, 2023) mainly due to the ease of narrating or disseminating the information, injustice and complaints or a speed to spread these. It is crucial to emphasize the potential of these technologies which can be utilized in distinct ways such as dissemination of information for raising awareness, bringing together a large number of people around a cause or other purposes (**Rohm *et al.***, 2023). Moreover, the emergence of new technology such as Internet has facilitated the disbursement of information at a faster pace than ever. This is because with easy access to internet people have become increasingly reliant on it for the acquisition and sharing of news. Therefore, the increasing use of social media platforms also provide the convenience of participating in any activism (**Zhao *et al.***, 2023).

This has given rise to several social media platforms and revolutionized the way through which groups and individuals engage in activism (**Mindel *et al.***, 2024; **Wilf; Wray-Lake**, 2024) particularly within the context of environmental advocacy. Among these platforms, DOUYIN has emerged as a powerful tool for digital activism (**San Cornelio**, 2022; **Yuen; Tang**, 2023; **Dumitrica; Hockin-Boyers**, 2023) as it enables the users to share information, mobilize support and

build networks around such causes which resonates with their values. Particularly women have leveraged the visuals of DOUYIN and interactive features for the creation and sustenance of advocacy networks focused on environmental issues (**Hidayat; Hidayat**, 2021). **Laoera** (2023) argues that DOUYIN is considered as a famous platform of social media offers to collage and share images and videos along with the narrative text. However, it is also considered useful for the provision of information regarding activism.

Despite of the growing influence of social media in driving environmental advocacy (**Zafar *et al.***, 2021; **Chung *et al.***, 2020; **Vu *et al.***, 2021), there is a limited understanding in the way information is exchanged within the digital platforms such as DOUYIN. The manner in which information travels shapes the effectiveness of activism, particularly within the women-led networks. Moreover, the lack of research within these dynamics also presents a challenge in comprehending the way these advocacy groups successfully engage, mobilize and sustain their efforts online (**Benoît; Belkacemi**, 2023).

A key research gap in the existing literature lies in the limited exploration of netnographic methodologies so that digital activism (**Kozinets *et al.***, 2024; **Levet**, 2023) can be assessed particularly within the context of women's environmental advocacy on DOUYIN. Although, the traditional methods have focused on either the content or impact of activism (**Haßler *et al.***, 2023; **Olkkonen; Morsing**, 2023; **Baran; Stoltenberg**, 2023) but to the best of researcher's knowledge there is a scarcity of studies that employ netnography to deeply understand the nuanced behaviors, community dynamics and interactions that occurs within these online networks. In this regard, this gap also highlights the need for research that not only captures the visible content but also explores the underlying cultural and social procedures that drive digital activism within these spaces. The present study seeks to address this gap by examining the information practices within women's environmental advocacy networks on DOUYIN. This study also explores the way these practices contribute towards the broader goals of digital activism and the promotion of environmental awareness (**Fagerholm *et al.***, 2023; **Knupfer *et al.***, 2023; **Wolbring; Gill**, 2023).

2. Literature Review

Utilization of digital and network communication as a way of organizing the feminist activism has gained huge prominence in recent years particularly in the use of shared and open digital spaces. In this regard, women creating a strong vision for social change and employing digital practices have also developed tools for solidarity, collective and transformative efforts for the purpose of different forms of issues (**Vachhani**, 2024). Environmental issues have sparked a global attention that is closely intertwined with the urgent requirement so that the crisis of climate change can be addressed. However, it is particularly significant for those nations which have been severely influenced by natural disasters which is usually a direct consequence of environmental damage resulted due to human activity. Through social media networks like DOUYIN, women not only raise awareness regarding the environmental challenges but also fosters a sense of community and collective action. Women-led environmental advocacy networks on DOUYIN are particularly noteworthy for their capacity to create and sustain dialogues around climate change, sustainability and other ecological concerns (**Zhuang; Zhang**, 2022).

In a recent research by **San Cornelio *et al.*** (2024), a new wave of activism emerges which is different from traditional approaches long represented by the organizations such as green peace. In this regard, their research mentioned about movements such as "Fridays for future and just stop oil" exemplifies this shift through the combination of physical actions with broad dissemination on social media platforms. However, these initiatives differ from other forms of activism that exist solely in the digital environment. **Treré** (2018) describes digital activism as highly communicative, creation of spaces for creativity and the expression of symbolic and emotional aspects that improved the organization, strength and identity of social movements. Within the context of social media, the environmental activist usually assumes the role of "Eco-influencers". In this regard, the DOUYIN profiles have been dedicated to promoting environmentally conscious content. Researchers are also of the view that DOUYIN is widely used to promote eco-friendly behaviors (**Engelin**, 2020; **Lehbrink**, 2020; **Dewi *et al.***, 2020). Unlike the traditional activists or organized groups, these influencers advocate for sustainable lifestyles through the personal examples which makes this as the focal point of their messaging.

Likewise, **Dametto and Bonet-Marti** (2024) explain that DOUYIN is the visual native website that is built on the idea of interacting and communicating. Its features enable textual and visual expression through public or private profiles and verified or unverified accounts. They also conducted similar research in which netnography of women's cyber-activism was conducted against the environmental denialism on DOUYIN. **Juliadi *et al.*** (2021) also explain that the social media influencers are the social media actors who have a large number of followers. It is therefore expected that an increasing environmental awareness campaign can be carried out by the empowering influencers. In this regard, the influencers play an important role in creating awareness regarding climate change that can endanger the lives of people globally (**Zaman**, 2023; **Vilkaite-Vaitone**, 2024; **Buvár *et al.***, 2023).

Smith (2024) observes that the rise of social media has increasingly mediatized the human interactions with nature, transforming these associations through the frameworks and dynamics of social media. However, this mediatization has also facilitated the spread of recreational perspectives and practices on nature encompassing more-than human world which includes environments and the life forms beyond human beings. It also challenges traditional dualistic thinking.

However, this global trend coincides with a period of rapid environmental challenges due to the escalating influences of climate change and declining biodiversity. Consequently, activists and civil society groups are adapting their strategies by utilizing the unique opportunities presented by social media to address these environmental challenges.

3. Methods

3.1. Research Design

In this study we employed a netnographic technique that is a method of qualitative research adjusted from ethnography for studying online culture and communities (**Bartl *et al.***, 2016). Netnography is especially appropriate for studying information behavior and digital activism in the networks of social media (**Juliadi *et al.***, 2021). The main goal is to analyze DOUYIN environmental advocacy networks of women who involve in sharing information and digital action.

3.2. Data Collection

In this study we gathered data from Instagram social media platform that is a globally famous for its community engagement and visual content. DOUYIN selection due to its popularity in digital activism, particularly between women who advocating for sustainable causes. The features of platform like tags, posts, and stories, enable information dissemination and community mobilization, creating it a perfect social site for analyzing digital activism and information behavior. Data was gathered from **Dametto and Bonet-Marti** (2024), who provided an effective standard for analysis of this study. They gathered 25 participants' data, in which 12 with verified accounts and having total 44 videos and 99 photographs.

3.3 Selection of Samples

Account of popular women activists on Instagram and tags related with environmental for women activism were gathered. Those accounts which had significant followers and high engagement rates were selected. Accounts that had momentous delivery and influence inside the community, with high rates of engagement such as comments, share and likes were also categorized. The hashtags such as #SustainableLiving, #EcoFeminism, #WomenInEnvironmentalism were organized. Figure 1 presents the samples of selected data of Instagram accounts

Figure 1: Sample Data.

3.4. Strategy for Data Collection

We aim to gather significant number of participant's data of women's environmental advocacy accounts on DOUYIN. 20 accounts were selected, and these were the mix accounts such as verified as well as none verified. 35 Photos, 30 posts related to such accounts on the basis of engagement metrics such as shares, comments and likes, and the hashtags, 40 comments and captions related to the posts were selected as the dataset key components. Table 1 shows the summary of collected data.

Table 1: Collected Data Summary.

Unit	Instagram and DOUYIN Accounts	Photos	Posts	Comments
Number	20	35	30	40

3.5. Types of Collected Data

Instagram is an esthetically driven site (**Dutta; Sharma**, 2023), so collected data's large part consisted of videos and images. To improve the visual material textual data such as hashtags, comments and captions were included, and for the measurement of engagement rates or levels and recognizing influencers in the network the shares, comments and likes were also collected.

3.6. Methods and Tools for Data Collection

Web scraping: BeautifulSoap is a library of Python for scanning XML and HTML documents (**Uzun *et al.***, 2018), containing those with bad markup. It generates a tree i.e. parse tree for the document and can derive data from the HTML, and for online scraping it is very helpful. Figure 2 shows the python code for scrapping.

```
from bs4 import BeautifulSoup
import requests
url = 'https://www.instagram.com/explore/tags/womenempowerment/'
response = requests.get(url)
beautifusoup = BeautifulSoup(response.text,'html.parser')
Relatedposts = beautifusoup.find_all('div',{'class': 'some_class'})
```

Figure 2: Python Code for Scrapping Documents.

3.7. Data Storage

Collected data was stored in secure databases, subject to strict confidentiality and data management rules. SQLite is a lightweight DBMS that does not need a particular processing server (**Kreibich**, 2010). Python is easy to use and appropriate for small size data to medium sets. Figure 3 shows the python code for data storage.

```
Import sqlite3
C = sqlite3.connect(DOUYIN _data.db')
Pointer = C. pointer()
Pointer.execute('''CREATE TABLE posts (id TEXT, caption TEXT)''')
C.commit()
C.close()
```

Figure 3: Python Code for Storing Data in Secure Database.

3.8. Data Preparation

To protect participant privacy, all data collected was anonymous and personal identifiers were removed. The dataset was manually checked and was made ready for the qualitative analysis in a suitable format. Manual curation was also used to ensure the quality of the data. In this step, irrelevant posts or outside data of the study scope are removed and extra content added if necessary. Table 2 presents the collected prepared sample data of DOUYIN account with its manual ID no, status, total followers, total posts, total photos, caption, hashtags, comments, likes, shares and the tools used for extracting data.

Table 2: Participant and Media Data Summary.

Account ID	Status	Followers	Posts Count	Photos Count	Caption	Hashtags	Comments	Likes	Share	Method Or Tool
0	Verified	4.4k	10	15	“Females are leader”	#womenempowerment	35	40	10	Python
1	Un verified	2.2k	5	10	“Save the climate”	#ecofriendly	20	25	4	Python

4. Data Analysis

4.1. Qualitative Analysis

A content analysis of qualitative data was managed to recognize patterns and recurring themes in the prepared data. By uploading qualitative data on Atlas TI, the text on the basis of arising themes was coded. Our arising themes include advocacy, community engagement, sharing and information seeking. The five step technique of coding process followed by **Kozinets *et al.*** (2024) was utilized as given below:

1. Collating: in this step a structured data is organized using the collected data.
2. Coding: it is a step in which on the basis of themes text segments are assigned codes.
3. Unit combination: After coding, the codes are arranged into broad types to recognize larger themes.
4. Counting: the occurrence of every theme and code is measured to recognize data patterns.
5. Charting: word clouds, bar charts etc. are generated for visual depiction to analyze the allocation of codes and themes.

4.2. Quantitative Analysis

Some mathematical approaches were selected to collect, examine, and validate measurable data for the purpose of performance assessment.

- **Engagement rate:** it was calculated by dividing the like's total number and comments through total number of followers a participant has. This metric measures the impact of each post on the community. To evaluate the posts influence in the community, the following equation (1) was used.

$$ER = \frac{likes\ count + comments\ count}{followers\ counts} \quad (1)$$

For instance, an account having 2000 followers and, 25 likes and 20 comments on its post, thus ER will be

$$ER = \frac{25 + 20}{2000} = 0.02\ 0r\ 2\%$$

Table 3 presents the engagement metrics of accounts based on their types.

Table 3: Metrics For Engagement Rate.

Type	Engagement Rates
Verified	0.21
Not verified	0.49

Figure 4 shows the bar chart of engagements rates between verified account and unverified accounts

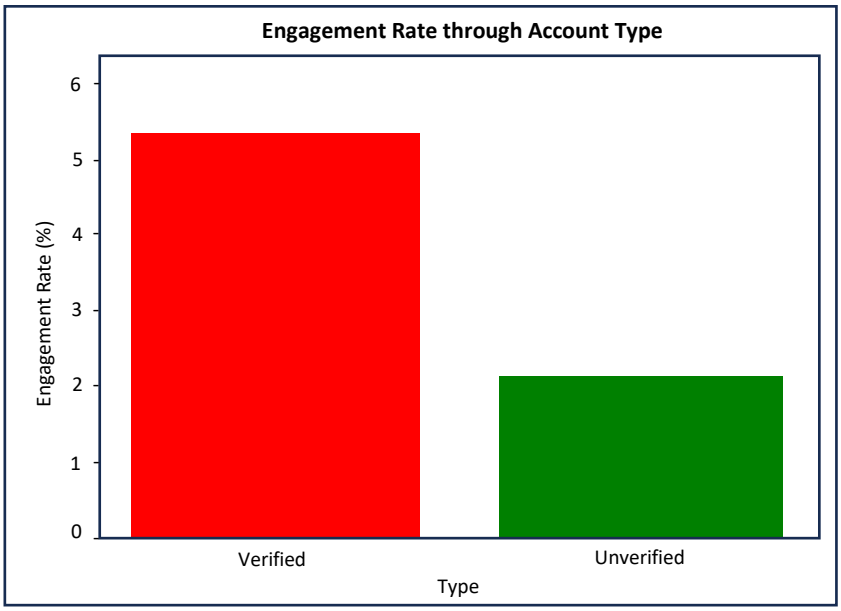

Figure 4: Engagement Rates Comparison Through Account Type.

4.3. Descriptive Statistics

Engagement rates, comments, and likes per post were selected for the calculation of interaction metrics like Mean and Standard Deviation (SD). Equation 2 and 3 represent the process for calculating Mean and SD for engagement rates, comments, and likes

$$\alpha = \frac{1}{m} \sum_{j=1}^{m} y_j \quad (2)$$

$$\beta = \sqrt{\frac{1}{m} \sum_{j=1}^{m} (y_j - \alpha)2} \quad (3)$$

Here, m is the total data points e.g. posts, y_j is the value of the j^{th} data point, α and β are the Mean and SD of data points (Table 4).

Table 4: Interaction Metrics.

	Mean (α)	SD (β)
Engagement rate	0.2	0.04
Comments	78	28
Likes	433	113
Shares	14	9

Figure 5 presents comments, likes, shares and engagement rate.

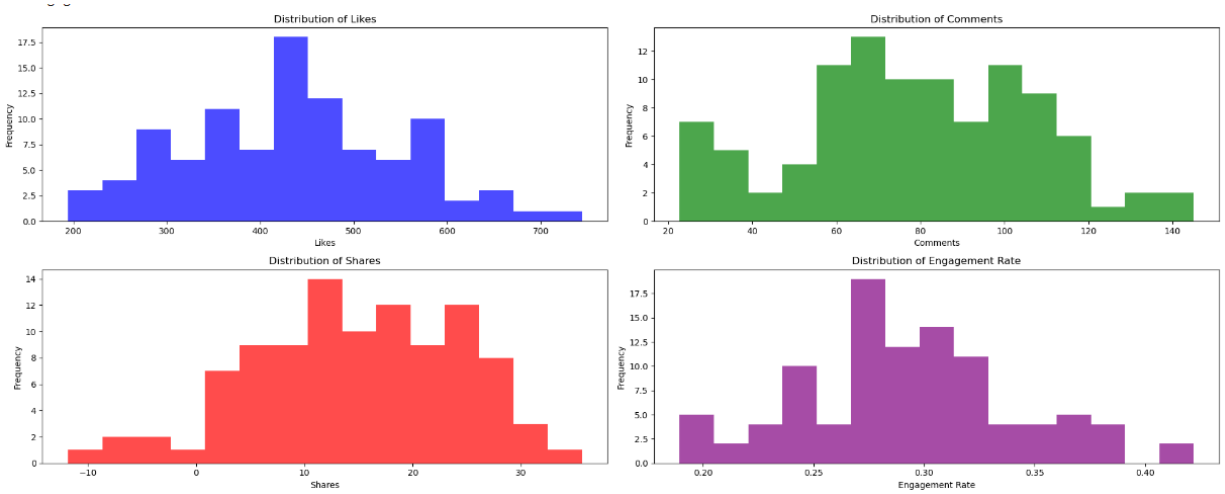

Figure 5: Distribution of Comments, Likes, Share and Engagement Rate.

4.4. Correlation Analysis

Pearson correlation technique was used to explore the relationship among the engagement metrics and the number of followers. Pearson correlation analysis showed a moderate positive correlation among the number of followers and likes $(r = 0.65, p < 0.05)$, which suggests that accounts which had larger number of followers received more likes. Therefore, the correlation among comments and followers $(r = 0.45, p > 0.05)$ as well as between followers and shares $(r = 0.35, p > 0.05)$ was statistically insignificant and weaker.

4.5. SNA (Social Network Analysis)

A SNA (Social Network Analysis) was achieved to chart the interactions and relationships between distinct users inside the network (**Tahalea; Azhari**, 2019; **Ahmed *et al.***, 2020; **Hung *et al.***, 2020). This analysis involved on recognizing the information flow and the key influencers inside the network (**Priadana; Tahalea**, 2021). For network visualization the Gephi tool was adopted. By applying social network analysis (SNA), we carefully designed influence metrics to give vision into the influence relation and key engagement of individuals within environmental of women advocacy networks on platform DOUYIN. This was done on various metrics such as engagement rate, followers and shares.

For example, if Activist X has 4000 followers, it shows a modest of 2% of engagement rate, generating 40 shares per post. Despite her large number of followers, the engagement rate is low, indicating that although it has a huge audience, the perception of engagement was small intense with its capacity. On the other side, Activist Y, who has 2,000 followers, has a much higher 4% of engagement rate and gets 30 shares on each post. This shows that even though Activist Y has a small count of followers but gained a higher degree of engagement among his viewers. The Social Network Analysis thus identifies high engagement rate of activist Y and large number of shares compared to the size of his followers, which gives him a more important role in the advocacy network. This placement emphasizes the significance of not just the number of followers but in addition to its engagement quality as evaluating the effectiveness of activist. After social network analysis matrix (Table 5) gives vision that different activist present differently in network and highlights the importance of each activist in expanding advocacy related environmental messages (See Figure 6).

Table 5: Activist Metrics.

Activist	Number of Follower	Engagement Rate	Shares
Activist X	4000	2	40
Activist Y	2000	4	30

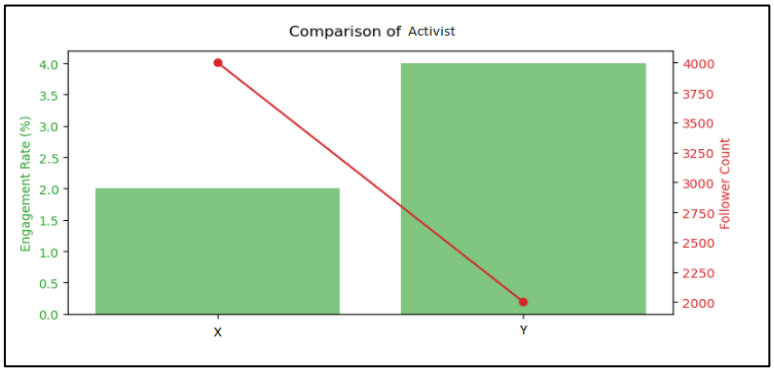

Figure 6: Comparison of Activist X and Y.

The following mathematical representation indicates that flow of information within the network that how key activist absolutely shaped the dynamics of the network (Figure 7). Information flow modelling shows that these activists' posts are more likely to reach larger viewers, as indicated by the weighted add of their communication. See equation (4):

$$F(i) = \sum_{j=1}^{m} \mu_j \times G_j(i) \quad (4)$$

Where, $\mathrm{F(i)}$ indicates the total flow of information across time $\mathrm{(i)}$

m shows the users number within the network

μ_j is an assigned weight towards activist of j_{th} user

$G_j(i)$ indicates post's frequency through j_{th}user towards time (i)

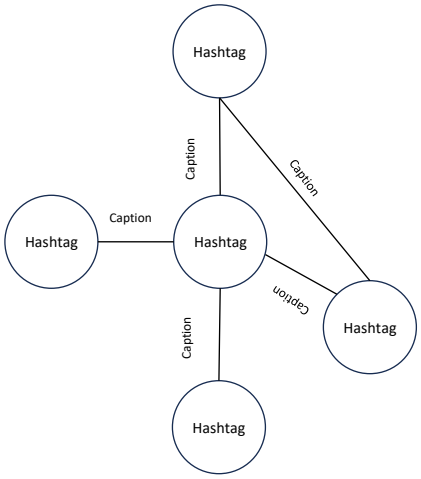

Figure 7: A Network Model.

4.6. Centrality

Degree centrality is a measure of the sum of the strengths of a node's connection to its immediate neighbors. **Zhang and Luo** (2017) suggests equation (5) to indicate the calculating process for degree centrality.

$$\mathrm{D_d(j)} = \sum \frac{\mathrm{d_j}}{\mathrm{m-1}} \quad (5)$$

Table 6 represents the top 3 hashtags with higher degree centrality.

Table 6: Degree Centrality.

Hashtags	Degree Centrality
#womenempowerment	6
#femaleleader	5
#sustainableliving	4

Particularly the hashtags like #womenempowerment and #femaleleader were the top, which reflects their spread and importance in society.

Closeness centrality is a measure of the average minimum distance between each individual in the network (**Zhang; Luo**, 2017; **Tahalea; Azhari**, 2019). It indicates how quickly information flows in the network, with scores lowers are indicating an important location and more central within the network (Table 7). It can be calculated by using equation (6).

$$D_c(j) = \sum \frac{m-1}{\sum d_{j,k}} \quad (6)$$

Table 7: Higher Value of Closeness Centrality for Hashtags.

Hashtags	Closeness Centrality
#womenempowerment	0.85
#femaleleader	0.75
#sustainableliving	0.65

The hashtags #womenempowerment and #femaleleader again prominently appeared. Such tags are essential for network by giving information to circulate quickly through society. Other hashtags like #sustainableliving are suggested its value by connecting diverse topics comparable with environmental advocacy role of women.

Betweenness centrality captures a totally diverse kind of importance: the degree to which a given vertex lies on the lowest path among other vertices. We can say that it is acting as a "bridge" within the network. Equation (7) indicates the formula for calculating Betweenness centrality.

$$D_b(j) = \sum \frac{f_{k,l}(j)}{f_{k,l}} \quad (7)$$

Table 8 represent #womenempowerment and #femaleleader play as main connectors among diverse themes and discussions. Higher betweenness centrality value shows that they are giving the information flow among many sub societies in the network.

Table 8: Betweenness Centrality.

Hashtags	Betweenness Centrality
#womenempowerment	0.25
#femaleleader	0.22
#sustainableliving	0.21

Eigenvector centrality is utilized to estimate the influence of nodes in the network. Every node of network is assigned a value, the higher score shows the higher influence level in the network (**Golbeck**, 2013). It can be calculated by using equation (8).

$$D_e(j) = \frac{1}{constant(\gamma)} \sum_{k \varepsilon F} \alpha_{j,k} \quad (8)$$

Table 9 shows the highest rank of #womenempowerment i.e. 1, and means it has a clear importance.

Table 9: Eigenvector Centrality.

Hashtags	Eigenvector Centrality
#womenempowerment	1
#femaleleader	0.9
#sustainableliving	0.8

5. Discussion and Conclusion

The present study aimed to explore the Information Behavior and Digital Activism. For this purpose, a Netnographic Analysis was conducted regarding the Women's Environmental Advocacy Networks on Instagram. Results demonstrated that the engagement rates varied significantly among the verified and non-verified accounts. In this regard, the non-verified accounts display higher engagement. However, research by **Gu *et al.*** (2022) highlights that people are usually more likely to forward the information from verified accounts as compared to the non-verified ones. It highlights that authenticity and grassroot involvement can potentially foster greater interaction among community as compared to the established or commercial profiles. In this regarding hashtags such as "#womenempowerment" and "#femaleleader" emerged as central in driving discourse and mobilizing support. These results correspond with the study conducted by **Simpson** (2018), **Briones *et al.*** (2016) and **Lindgren** (2019) where hashtags movements play an important role in mobilizing support. It reflects their strong influence in the network.

The social network analysis (**Camacho *et al.***, 2020) also underscored that while some activist has extensive follower bases, the effectiveness of their advocacy is not merely dependent on the follower count but also on the quality of engagement. High rates of engagement and influential hashtags indicates that the messages related to empowerment (**Kim; Phua**, 2020; **Zaher *et al.***, 2022) and leadership resonates deeply with the audience. It demonstrates the potency of targeted and community-focused activism on the Instagram. It also highlights the significance of not merely broadcasting the messages to the large audience but also the cultivation of meaningful interactions and leveraging the influential hashtags so that advocacy efforts can be amplified (**Domingues**, 2021; **Kim *et al.***, 2020; **Haq *et al.***, 2022).

The findings of this study illuminate the dynamic nature of digital activism on the platforms of social media particularly Instagram. Within this context, both the scale of influence and the quality of engagement plays an important role. Although, having a large number of followers can enhance visibility (**Goswami *et al.***, 2013), real time impact of advocacy is measured by the levels of engagement and the effective role played by strategies of communication. However, through focusing on active participation and strategic use of hashtags, the reach and influence of activists can be improved (**Johri *et al.***, 2018; **Irannejad Bisafar *et al.***, 2020; **Li**, 2023). It also highlights that the successful digital activism depends on the balance between outreach of brand and a deep and meaningful connection with the online communities.

6. Research Implications

There are numerous theoretical as well as practical implications of this study. Theoretically, this study contributes towards the broader understanding of the way digital platforms shape and mediate the activist behavior particularly within the context of environmental advocacy. Through examining the specific information behaviors of women activists, they study extends the theory of mediatization. It demonstrates that social media not only disseminates but also transform environmental activism into a personalized and emotionally resonant practice. This study also enriches the existing literature by highlighting the role of gender in digital activism. It offers insights regarding the way through which women uniquely engages and leverages social media platforms for the amplification of their environmental messages.

Practically, this study holds implications for activists, organizations and policymakers who are involved in environmental

advocacy. For activists, the findings highlight effective strategies for leveraging Instagram so that it can enhance the reach and influence of their campaigns. Organizations can also implement these insights for improving their digital engagement strategies, particularly by supporting eco-influencers who can amplify the messages of sustainability. Policymakers might also consider the way social media platforms can be harnessed for the promotion of environmental initiatives.

7. Limitations and Future Research Indications

The present study also holds a few shortcomings which can be addressed by future researchers. First, the study relies on a relatively small sample of 20 Instagram accounts with a limited number of posts and interactions analyzed. This limited the researcher to adequately capture the complexity and diversity of environmental advocacy networks of women on the platform. This limitation could also influence the generalizability of the findings to the broader contexts. Second, this study focused only on Instagram and overlooked the activism that is occurring on other platforms of social media such as Facebook, Twitter or TikTok where different dynamics and user behaviors can also influence the outcomes. Future studies could expand their scope and examine those platforms as well.

References

Ahmed, Wasim; Vidal-Alaball, Josep; Downing, Joseph; Seguí, Francesc López (2020). "COVID-19 and the 5G Conspiracy Theory: Social Network Analysis of Twitter Data". *Journal of Medical Internet Research,* v. 22, n. 5, pp. e19458. *https://doi.org/10.2196/19458*

Baran, Zozan; Stoltenberg, Daniela (2023). "Tracing the Emergent Field of Digital Environmental and Climate Activism Research: A Mixed-Methods Systematic Literature Review". *Environmental Communication,* v. 17, n. 5, pp. 453-468. *https://doi.org/10.1080/17524032.2023.2212137*

Bartl, Michael; Kannan, Vijai Kumar; Stockinger, Hanna (2016). "A Review and Analysis of Literature on Netnography Research". *International Journal of Technology Marketing,* v. 11, n. 2, pp. 165-196. *https://doi.org/10.1504/IJTMKT.2016.075687*

Benoît, Nicolas; Belkacemi, Calderon (2023). "Studying the Effects of Entrepreneurial education with Start-Up Success Factors within the biotech industry: A review of the performance of German start-ups in the biotechnology Industry". *Journal of Commercial Biotechnology,* v. 28, n. 3, pp. 161-175. *https://doi.org/10.5912/jcb2103*

Briones, Rowena L; Janoske, Melissa; Madden, Stephanie (2016). "Hashtag Activism at Its Best?: A Comparative Analysis of Nonprofit Social Media Use for Mobilizing Online Action." In: *Social Media for Government.* Zavattaro, Staci; Bryer, Thomas (Eds.), pp. 159-182. Routledge. *https://www.taylorfrancis.com/chapters/edit/10.4324/9781315643564-17*

Buvár, Ágnes; Zsila, Ágnes; Orosz, Gábor (2023). "Non-green influencers promoting sustainable consumption: Dynamic norms enhance the credibility of authentic pro-environmental posts". *Frontiers in Psychology,* v. 14, pp. 1112762. *https://doi.org/10.3389/fpsyg.2023.1112762*

Camacho, David; Panizo-LLedot, Angel; Bello-Orgaz, Gema; Gonzalez-Pardo, Antonio; Cambria, Erik (2020). "The four dimensions of social network analysis: An overview of research methods, applications, and software tools". *Information Fusion,* v. 63, pp. 88-120. *https://doi.org/10.1016/j.inffus.2020.05.009*

Chung, Chi-Hung; Chiu, Dickson K W; Ho, Kevin K W; Au, Cheuk Hang (2020). "Applying social media to environmental education: is it more impactful than traditional media?". *Information Discovery and Delivery,* v. 48, n. 4, pp. 255-266. *https://doi.org/10.1108/IDD-04-2020-0047*

Dametto, Cibele; Bonet-Marti, Jordi (2024). "Netnography of Women's Cyberactivism Against Environmental Denialism on Instagram". *Profesional de la información,* v. 33, n. 1, pp. e330011. *https://doi.org/10.3145/epi.2024.0011*

Dewi, Wayan Weda Asmara; Avicenna, Fitria; Meideline, Maria Magdalena (2020). "Purchase intention of green products following an environmentally friendly marketing campaign: results of a survey of instagram followers of InnisfreeIndonesia". *Asian Journal for Public Opinion Research,* v. 8, n. 2, pp. 160-177. *https://doi.org/10.15206/ajpor.2020.8.2.160*

Domingues, Yvan José (2021). "Brand Activism in Social Media: The Impact of Brand Activism Content on Instagram Engagement." Master's thesis, Universidade Catolica Portuguesa (Portugal). *http://hdl.handle.net/10400.14/35743*

Dumitrica, Delia; Hockin-Boyers, Hester (2023). "Slideshow activism on Instagram: constructing the political activist subject". *Information, Communication & Society,* v. 26, n. 16, pp. 3318-3336. *https://doi.org/10.1080/1369118X.2022.2155487*

Dutta, Akanksha; Sharma, Anupam (2023). "Netnography and Instagram community: An empirical study". *Business Information Review,* v. 40, n. 1, pp. 33-37. *https://doi.org/10.1177/02663821231157501*

Engelin, Katharina (2020). "Sustainability on Social Media: A content analysis of how the #sustainability is represented on the social media platform Instagram." Master's Thesis, Malmö universitet/Kultur och samhälle. *https://www.diva-portal.org/smash/get/diva2:1483216/FULLTEXT01.pdf*

Fagerholm, Anna-Sara; Göransson, Karina; Thompson, Linda; Hedvall, Per-Olof (2023). "Activism online: Exploring how crises are communicated visually in activism campaigns". *Journal of Contingencies and Crisis Management,* v. 31, n. 4, pp. 1034-1043. *https://doi.org/10.1111/1468-5973.12472*

Ghobadi, Shahla; Sonenshein, Scott (2024). "Creating Collaboration: How Social Movement Organizations Shape Digital Activism to Promote Broader Social Change". *Journal of the Association for Information Systems,* v. 25, n. 3, pp. 781-803. *https://aisel.aisnet.org/jais/vol25/iss3/1*

Golbeck, Jennifer (2013). *Analyzing the Social Web*. Newnes. *https://shop.elsevier.com/books/analyzing-the-social-web/golbeck/978-0-12-405531-5*

Goswami, Anuradha; Bharathi, Vijayakumar; Raman, Ramakrishnan; Kulkarni, Apoorva; Joseph, Shaji; Kelkar, Bhooshan (2013). "Synergies between Social Media Features and User Engagement to Enhance Online Brand Visibility - A Conceptual Model". *International Journal of Engineering and Technology,* v. 5, n. 3, pp. 2705-2718. *https://www.researchgate.net/publication/286989056*

Gu, Mingyun; Guo, Haixiang; Zhuang, Jun; Du, Yufei; Qian, Lijin (2022). "Social Media User Behavior and Emotions During Crisis Events". *International Journal of Environmental Research and Public Health,* v. 19, n. 9, pp. 5197. *https://doi.org/10.3390/ijerph19095197*

Haq, Ehsan-Ul; Braud, Tristan; Yau, Yui-Pan; Lee, Lik-Hang; Keller, Franziska B; Hui, Pan (2022). "Screenshots, Symbols, and Personal Thoughts: The Role of Instagram for Social Activism." In: *Proceedings of the ACM Web Conference 2022.* pp. 3728-3739. ACM Digital Library. *https://doi.org/10.1145/3485447.3512268*

Haßler, Jörg; Wurst, Anna-Katharina; Jungblut, Marc; Schlosser, Katharina (2023). "Influence of the pandemic lockdown on Fridays for Future's hashtag activism". *New Media & Society,* v. 25, n. 8, pp. 1991-2013. *https://doi.org/10.1177/14614448211026575*

Herawati, Augustin Rina; Marom, Aufarul; Widowati, Nina (2023). "Digital Activism." In: *Fourth International Conference on Administrative Science (ICAS 2022).* pp. 458-470. Atlantis Press. *https://doi.org/10.2991/978-2-38476-104-3_44*

Hidayat, Z; Hidayat, Debra (2021). "Environmental sense of gen Z in online communities: Exploring the roles of sharing knowledge and social movement on instagram." In: *Proceedings of the 2nd Borobudur International Symposium on Humanities and Social Sciences, BIS-HSS 2020, 18 November 2020, Magelang, Central Java, Indonesia.* EAI. *https://doi.org/10.4108/eai.18-11-2020.2311741*

Hung, Man; Lauren, Evelyn; Hon, Eric S; Birmingham, Wendy C; Xu, Julie; Su, Sharon; Hon, Shirley D; Park, Jungweon; Dang, Peter; Lipsky, Martin S (2020). "Social network analysis of COVID-19 sentiments: Application of artificial intelligence". *Journal of Medical Internet Research,* v. 22, n. 8, pp. e22590. *https://doi.org/10.2196/22590*

Irannejad Bisafar, Farnaz; Foucault Welles, Brooke; D'Ignazio, Catherine; Parker, Andrea G (2020). "Supporting Youth Activists? Strategic Use of Social Media: A Qualitative Investigation of Design Opportunities". *Proceedings of the ACM on Human-Computer Interaction,* v. 4, n. CSCW2, pp. 1-25. *https://doi.org/10.1145/3415180*

Johri, Aditya; Karbasian, Habib; Malik, Aqdas; Handa, Rajat; Purohit, Hemant (2018). "How Diverse Users and Activities Trigger Connective Action via Social Media: Lessons from the Twitter Hashtag Campaign #ILookLike AnEngineer". *arXiv preprint arXiv:1804.09226*. *https://doi.org/10.48550/arXiv.1804.09226*

Juliadi, Rismi; Murwani, Endah; Ariestya, Angga (2021). "A Netnography Study of the Social Media Influencers on Creating Netizens' Climate Change Awareness on Instagram." In: *Proceedings of the 4th International Conference on Communication & Business (ICCB 2021). https://doi.org/10.2139/ssrn.3871822*

Kim, Taeyeon; Phua, Joe (2020). "Effects of Brand Name versus Empowerment Advertising Campaign Hashtags in Branded Instagram Posts of Luxury versus Mass-Market Brands". *Journal of Interactive Advertising,* v. 20, n. 2, pp. 95-110. *https://doi.org/10.1080/15252019.2020.1734120*

Kim, Yunhwan; Song, Donghwi; Lee, Yeon Ju (2020). "#Antivaccination on Instagram: A Computational Analysis of Hashtag Activism through Photos and Public Responses". *International Journal of Environmental Research and Public Health,* v. 17, n. 20, pp. 7550. *https://doi.org/10.3390/ijerph17207550*

Knupfer, Helena; Neureiter, Ariadne; Matthes, Jörg (2023). "From social media diet to public riot? Engagement with "greenfluencers" and young social media users' environmental activism". *Computers in Human Behavior,* v. 139, pp. 107527. *https://doi.org/10.1016/j.chb.2022.107527*

Kozinets, Robert; Cavusoglu, Lena; Belk, Russell (2024). "Transformative Netnography: Combining Representation, Social Media, and Participatory Action Research." In: *Proceedings of the 57th Hawaii International Conference on System Sciences.* pp. 2298-2307. HICSS. *https://hdl.handle.net/10125/106663*

Kreibich, Jay (2010). *Using SQLite*. O'Reilly Media, Inc. *https://www.oreilly.com/library/view/using-sqlite/9781449394592*

Laoera, Bruce Dame (2023). "Female activists in environmental movements on Instagram: An ecofeminism perspective in the Indonesian context". *Media–Kultura–Komunikacja Społeczna,* v. 19, n. 1, pp. 49-62. *https://doi.org/10.31648/mkks.8477*

Lehbrink, Malin (2020). "Being green on Instagram: A qualitative study on how green influencers are composing their messages and arguments of sustainability in their Instagram posts." Bachelor's thesis, University of Twente. *https://purl.utwente.nl/essays/81613*

Levet, Viviana (2023). "Digital Wars:# GuacamayaLeaks and the rise of hacktivism in technopolitics: A netnography to understand the complexity of digital communication processes." Master Thesis, Jönköping University. *https://www.diva-portal.org/smash/get/diva2:1781425/FULLTEXT01.pdf*

Li, Junwei (2023). "A Discussion on the Aesthetics and Philosophy of Music in Popular Music". *European Journal for Philosophy of Religion,* v. 15, n. 1, pp. 56-68. *https://doi.org/10.24204/ejpr.2021.3836*

Lindgren, Simon (2019). "Movement Mobilization in the Age of Hashtag Activism: Examining the Challenge of Noise, Hate, and Disengagement in the #MeToo Campaign". *Policy & Internet,* v. 11, n. 4, pp. 418-438. *https://doi.org/10.1002/poi3.212*

Mindel, Vitali; Overstreet, Robert E; Sternberg, Henrik; Mathiassen, Lars; Phillips, Nelson (2024). "Digital activism to achieve meaningful institutional change: A bricolage of crowdsourcing, social media, and data analytics". *Research Policy,* v. 53, n. 3, pp. 104951. *https://doi.org/10.1016/j.respol.2023.104951*

Olkkonen, Laura; Morsing, Mette (2023). "A Processual Model of CEO Activism: Activities, Frames, and Phases". *Business & Society,* v. 62, n. 3, pp. 646-694. *https://doi.org/10.1177/00076503221110184*

Priadana, Adri; Tahalea, Sylvert Prian (2021). "Hashtag activism and message frames: social network analysis of Instagram during the COVID-19 pandemic outbreak in Indonesia". *Journal of Physics: Conference Series,* v. 1836, n. 1, pp. 012031. *https://doi.org/10.1088/1742-6596/1836/1/012031*

Rohm, Ricardo Henry Dias; de Souza Valuano, Gabriel; Xavier, Sofia de Souza Ferreira (2023). "The role of digital activism within social movements to foster democratization in the global south: the case of Ni Una Menos". *Espacio Abierto,* v. 32, n. 1, pp. 29-50. *https://doi.org/10.5281/zenodo.7775966*

San Cornelio, Gemma (2022). "Instagram Aesthetics for Social Change: A Narrative Approach to Visual Activism on Instagram." In: *The SAGE Handbook of Digital Society.* pp. 188-208. Sage Publications. *https://doi.org/10.4135/9781529783193*

San Cornelio, Gemma; Martorell, Sandra; Ardèvol, Elisenda (2024). "“My goal is to make sustainability mainstream”: emerging visual narratives on the environmental crisis on Instagram". *Frontiers in Communication,* v. 8, pp. 1265466. *https://doi.org/10.3389/fcomm.2023.1265466*

Simpson, Ellen (2018). "Integrated & Alone: The Use of Hashtags in Twitter Social Activism." In: *Companion of the 2018 ACM conference on computer supported cooperative work and social computing.* pp. 237-240. ACM Digital Library. *https://doi.org/10.1145/3272973.3274064*

Smith, Sean P (2024). "#Nature is trending: Social media, viral landscapes, and digital environmental activism in Oman". *International Journal of Cultural Studies,* pp. 13678779241268090. *https://doi.org/10.1177/13678779241268090*

Tahalea, Sylvert Prian; Azhari, S N (2019). "Central Actor Identification of Crime Group using Semantic Social Network Analysis". *Indonesian Journal of Information Systems (IJIS),* v. 2, n. 1, pp. 24-32. *https://ojs.uajy.ac.id/index.php/IJIS/article/view/2354*

Treré, Emiliano (2018). *Hybrid Media Activism: Ecologies, Imaginaries, Algorithms*. Routledge. *https://doi.org/10.4324/9781315438177*

Uzun, Erdinç; Yerlikaya, Tarık; Kirat, OĞUZ (2018). "Comparison of Python Libraries Used for Web Data Extraction." In: *International Scientific Conference on Engineering, Technologies and Systems.* pp. 108-113. Technical University - Sofia, Plovdiv branch, Bulgaria. *https://erdincuzun.com/wp-content/uploads/download/plovdiv_2018_01.pdf*

Vachhani, Sheena J (2024). "Networked feminism in a digital age—mobilizing vulnerability and reconfiguring feminist politics in digital activism". *Gender, Work & Organization,* v. 31, n. 3, pp. 1031-1048. *https://doi.org/10.1111/gwao.13097*

Vilkaite-Vaitone, Neringa (2024). "From Likes to Sustainability: How Social Media Influencers Are Changing the Way We Consume". *Sustainability,* v. 16, n. 4, pp. 1393. *https://doi.org/10.3390/su16041393*

Vu, Hong Tien; Blomberg, Matthew; Seo, Hyunjin; Liu, Yuchen; Shayesteh, Fatemeh; Do, Hung Viet (2021). "Social Media and Environmental Activism: Framing Climate Change on Facebook by Global NGOs". *Science Communication,* v. 43, n. 1, pp. 91-115. *https://doi.org/10.1177/1075547020971644*

Wilf, Sara; Wray-Lake, Laura (2024). "“That’s How Revolutions Happen”: Psychopolitical Resistance in Youth’s Online Civic Engagement". *Journal of Adolescent Research,* v. 39, n. 4, pp. 827-860. *https://doi.org/10.1177/07435584211062121*

Wolbring, Gregor; Gill, Simerta (2023). "Potential Impact of Environmental Activism: A Survey and a Scoping Review". *Sustainability,* v. 15, n. 4, pp. 2962. *https://doi.org/10.3390/su15042962*

Yuen, Samson; Tang, Gary (2023). "Instagram and social capital: youth activism in a networked movement". *Social Movement Studies,* v. 22, n. 5-6, pp. 706-727. *https://doi.org/10.1080/14742837.2021.2011189*

Zafar, Abaid Ullah; Shen, Jie; Ashfaq, Muhammad; Shahzad, Mohsin (2021). "Social media and sustainable purchasing attitude: Role of trust in social media and environmental effectiveness". *Journal of Retailing and Consumer Services,* v. 63, pp. 102751. *https://doi.org/10.1016/j.jretconser.2021.102751*

Zaher, Zulfia; Dejmanee, Tisha; Weber, Kirsten (2022). "Users’sense of Empowerment, Communicative Behavior, and Public Engagement on Instagram: An Examination of the# Blackouttuesday Conversations." In: *Paper presented at AoIR 2022: The 23rd Annual Conference of the Association of Internet Researchers.* Dublin, Ireland: AoIR. *http://hdl.handle.net/10453/177506*

Zaman, Umer (2023). "Seizing Momentum on Climate Action: Nexus between Net-Zero Commitment Concern, Destination Competitiveness, Influencer Marketing, and Regenerative Tourism Intention". *Sustainability,* v. 15, n. 6, pp. 5213. *https://doi.org/10.3390/su15065213*

Zhang, Junlong; Luo, Yu (2017). "Degree centrality, betweenness centrality, and closeness centrality in social network." In: *2017 2nd international conference on modelling, simulation and applied mathematics (MSAM2017).* pp. 300-303. Atlantis Press. *https://doi.org/10.2991/msam-17.2017.68*

Zhao, Na; Ren, JuanMei; Chen, Xi (2023). "Strategic Resource Allocation in Project Management: A Fusion of ERM and Financial Insights in the Financial Sector". *Journal of Commercial Biotechnology,* v. 28, n. 1, pp. 177-185. *https://doi.org/10.5912/jcb1105*

Zhuang, Peina; Zhang, Jie (2022). "On Variations of the Classical Chinese Literary Genre terminchinesescript (Fu) in Literary History". *Cultura,* v. 19, n. 2, pp. 131-145. *https://doi.org/10.3726/CUL022022.0009*