

Evaluating Public Engagement and Interactivity in the Context of Digital Media Management and Emerging Information Threats

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ABSTRACT

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Introduction: Digital media have become the main channels of communication. Information threats like fake news and cyber attacks can change public opinion. Assessing these threats will help identify risks and develop protection strategies.

Objectives: The study aims to develop recommendations for improving interactivity, increasing media literacy, and protecting against information threats by analysing and evaluating media education and security policies and strategies.

Methods: The methods used in the study were literature analysis, synthesis and analysis, observation, and generalisation.

Results: As a result of the study, a review of the regulatory and legal framework for information security in Ukraine was conducted. Methodological approaches to assessing public activity in digital media are identified. The study of public interaction with the media is based on analysing quantitative and qualitative indicators of user activity on Facebook and Instagram. The activity analysis on the leading media platforms (Telegram, Facebook, Instagram, Twitter) in Ukraine in 2022-2024 has revealed the main trends and problems in information consumption. Based on the study's results, six key recommendations have been formulated to increase interactivity, media literacy and protection against information threats in Ukraine, considering current challenges and threats.

Conclusions: The findings can help develop policies to improve information security and media education. It was found that digital media have expanded opportunities for public participation by facilitating access to information. Necessary measures have been developed to increase media literacy and information security to protect against threats and improve public debate.

Keywords: democracy, European integration, civil society, public administration mechanisms, non-governmental organizations.

INTRODUCTION

Digital media have become the modern world's primary information and communication channels. Understanding the level of interactivity and public participation in these media is critical to assessing their impact on society. Growing information threats, such as fake news, disinformation and cyber-attacks, can influence public opinion and behaviour. Assessing their impact will help identify risks and develop effective protection strategies. The study of public interaction with digital media allows us to identify trends, needs and problems that arise while consuming and creating information in the digital era. The study's results help develop policies and practices to enhance information security, improve media education, and increase public participation in discussions of critical social issues. Overall, this research is essential for understanding changes in the media environment and ensuring more effective information risk management.

LITERATURE REVIEW

According to US scientists, the electronic delivery of information and services is now an essential element of e-government. Research shows that regions with more households connected to the Internet have websites with more interactive services, which helps authorities improve their e-services [1].

Researchers at Lund University analyse the growing focus on influence as an essential aspect of political participation, especially in the context of the role of online media in democracy. They bring together various studies of participation, public spheres, and influence, highlighting both achievements and challenges. They consider public participation an intervention in power relations, exploring it in the context of rationality and emotionality. They analyse online environments and the ambivalence of online participation and influence, populism, and public pathways to knowledge [2].

According to Ukrainian scholars, interactive technologies allow one to enter the international market, strengthen the brand in the digital environment and create advertising media files. Attention is paid to the variability of the digital environment and the prospects for integrating technology into the work of travel companies [3]. It is proposed that the effectiveness of public authorities be considered through concepts such as efficiency, qualimetricity, and effectiveness. Scientists believe that assessing the effectiveness of governance is about measuring actual performance against the goals and results of past periods of digital development planning [3]. The authors compare administrative discretion in Germany and Ukraine as examples of full democracy and hybrid regimes. The authors emphasise that administrative discretion is underdeveloped in hybrid regimes, with excessive bureaucracy and a lack of clear boundaries of discretionary powers [5]. The challenges and security threats associated with the growing digitalisation of financial markets and the possibility of using artificial intelligence tools to fight corruption are considered [6]. The article analyses the concepts of intelligent infrastructure and the city, their implementation and challenges from the point of view of public management. The results emphasise the need for a systematic approach to innovative city management to remove barriers between goals and reality, considering the needs of human and creative capital in a digital society [7].

This study analyses the impact of interactive digital communities on public relations in the modern digital sphere. The article explores the opportunities and challenges of interactive media, as well as their impact on the transformation of PR practices. Using the theory of interactive media effects, it is argued that the development of media platforms contributes to social change through PR. The authors call on public relations professionals to adapt strategies to effectively harness the potential of interactive media for better communication [8]. Research is being conducted on specific GIZ projects - Sustainable Urban Development - Smart Cities in India and Urban Development in Ecuador, which use interactive touch tables to visualise city data and improve citizen interaction with information. The project aims to demonstrate the capabilities of such tables through pilot projects in Ecuador and India. The tables are open source, which allows them to be adapted to different contexts [9]. Using factor analysis, the effectiveness of public participation in the digitisation of environmental governance (DEG) is assessed, exploring the effects of environmental attitudes (EA), social impact (SI) and risk perception (RP). Development paths are suggested, including increasing environmental literacy and improving governance networks [10]. A study by Jordanian researchers highlights the role of social media in youth political engagement, emphasising the importance of considering gender differences to develop effective strategies [11]. Environmental impact assessment systematically assesses events' environmental, social and economic impacts. The Environmental Studies Research Institute (ESRI) has created customised web solutions and websites to digitise public EIA reports [12].

The research aims to analyse the level of public interaction with digital media and assess the impact of information threats on this process. This includes studying the public's interaction with media content, assessing existing policies and strategies on media education and information security that affect public interactivity and participation, and developing recommendations to improve public interactivity, increase media literacy and ensure protection against information threats.

METHODS

The analytical study of scientific publications of existing research on interactivity and media effects was carried out using scientometric databases such as Google Scholar, Scopus, and Web of Science. Materials from websites, social media and other digital platforms were collected and analysed to assess interactivity and public engagement. A thematic analysis of content was conducted to identify the main topics and issues in public interaction with digital

media using the leading media platforms Telegram, Facebook, Instagram, and Twitter. The study of specific examples of successful and unsuccessful practices of interactivity and participation in digital media to identify effective strategies was based on the study of the Facebook page of the NGO "Our Ecology" based on the observation method. The synthesis and analysis method was used to identify the main shortcomings and challenges to the effectiveness of policies and strategies in Ukraine regarding media education and information security. Recommendations for increasing interactivity, media literacy, and protection against information threats in Ukraine are formulated using the generalisation method.

RESULTS

Ukrainian legislation on information security covers several regulations to protect national interests in the information space. The primary legislative documents and initiatives regulating this area include (Table 1).

Table 1. Primary Ukrainian legislative documents on information security

Legal act	Main content
Law of Ukraine "On the Basic Principles of Ensuring Cybersecurity of Ukraine" (2017) [13]	It regulates cybersecurity as a component of national information security, defines the tasks and powers of the authorities, and provides for establishing the National Coordination Centre for Cybersecurity to coordinate the actions of state bodies.
Law of Ukraine "On Information" (1992) [14]	It establishes the legal framework for information activities, the rights and obligations of participants, the principles of access to information and protection of the information space from misinformation, and ensures freedom of speech.
Law of Ukraine "On the Protection of Information in Information and Telecommunication Systems" (1994) [15]	It regulates information protection in telecommunications systems, provides security measures and protection against unauthorised access, and protects state information resources.
Law of Ukraine "On Access to Public Information" (2011) [16]	The law allows citizens to access public information from state bodies and establishes mechanisms for monitoring its veracity and combating disinformation.
Law of Ukraine "On National Security" (2018) [17]	It defines information security as a critical element of national security and regulates the interaction of state bodies in countering information threats.
Law of Ukraine "On Sanctions" (2014) [18]	It allows the state to impose sanctions against individuals and organisations that threaten national security through disinformation, cyberattacks, or other information threats.
On the Doctrine of Information Security of Ukraine (2016) [19]	It is a strategic document establishing state policy priorities in information security, focusing on protecting national interests from disinformation, propaganda and cyberattacks.

Source: Law of Ukraine [13], [14], [15], [16], [17], [18]; National Security and Defence Council of Ukraine [19]

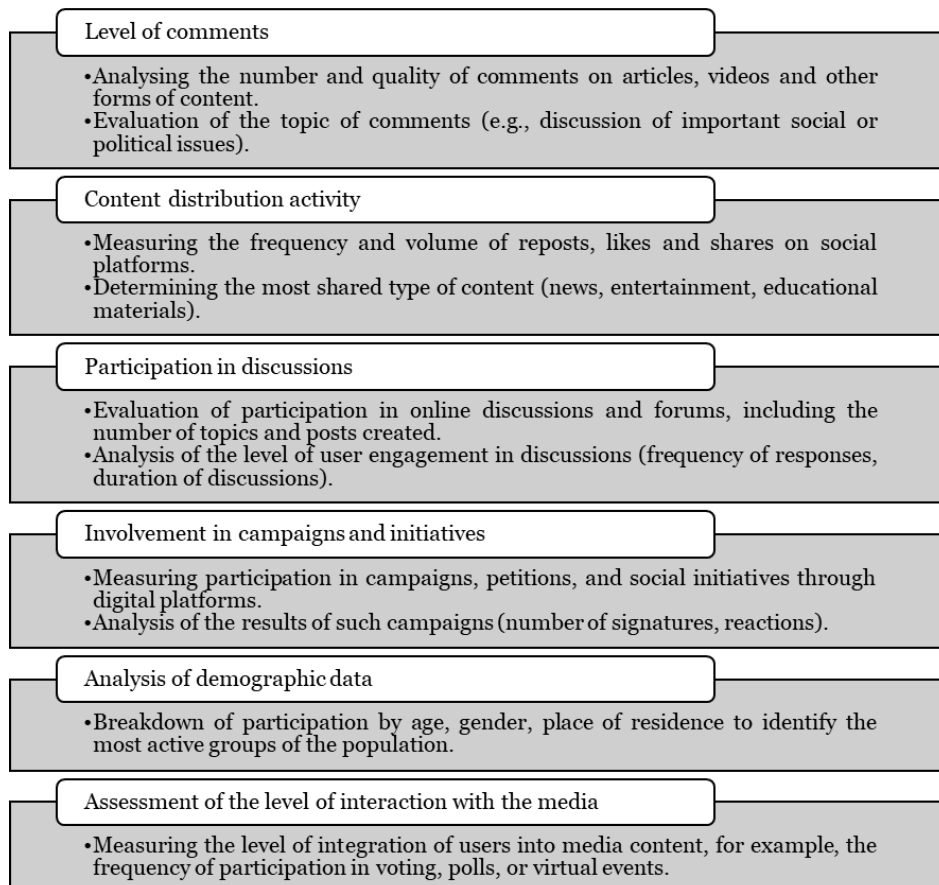
Ukraine has a Centre for Countering Disinformation, a specialised state body established in 2021 to monitor and counter disinformation, as well as to ensure information security in the context of hybrid warfare. Its activities aim to refute fakes, coordinate state policy in this area, and increase the population's media literacy level [20].

These legislative acts and strategies form the basis of Ukraine's information security, protecting against information threats and promoting media education and critical thinking among the population.

Citizen and stakeholder participation is essential to open government, as confirmed in provisions 8 and 9 of the OECD Council Recommendation on Open Government [21]. The OECD defines open government as "a culture of governance that upholds the principles of transparency, integrity, accountability and stakeholder participation to support democracy and inclusive development". This concept implies that citizens should be able to observe, understand, contribute to, monitor and evaluate government decisions and actions. Open government can increase

the legitimacy of decision-making and improve outcomes by engaging citizens, including underrepresented groups, and responding to the real needs of society. In the long run, open government reforms can strengthen trust in government and democracy. The OECD Guidelines for Citizen Participation Processes are intended for any civil servant or public institution interested in implementing a citizen participation process. The guidelines describe ten steps for designing, planning, implementing and evaluating a citizen participation process and discuss eight different methods of citizen engagement: information and data, open meetings, public consultations, open innovation, citizen science, civic monitoring, participatory budgeting and representation. The recommendations are illustrated with examples and practical guidance based on data collected by the OECD. Methodological approaches to measuring public engagement in digital media include six main approaches (Figure 1).

Figure 1. Methodological approaches to assessing public engagement in digital media



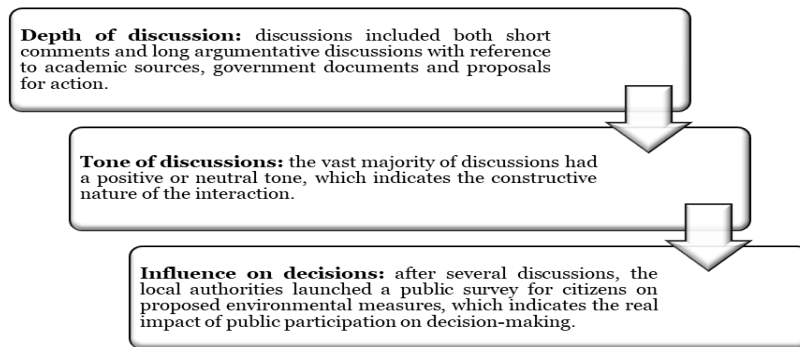
Source: based on Jelen-Sanchez [22], Connolly [23], Arangüena [24], Aldoseri [25]

Such approaches allow us to understand how actively the public interacts with digital media and what aspects need improvement or special attention.

The level of public interactivity in digital media was assessed by analysing quantitative and qualitative indicators of user activity on Facebook and Instagram.

The study assessed a public Facebook group of a civil society organisation, "Our Ecology" [26], created on 13 February 2018. It has 14323 members. During the month, the group recorded 40 comments on posts about local environmental problems and their solutions; users shared 300 posts on their pages, increasing the audience reach and drawing attention to the problem. The average number of reactions (likes, emojis) per post was 150. Two hundred fifty unique users actively participated in the discussions (repeatedly commenting or responding to the comments of others). The qualitative indicators of the group determine the depth of discussion, the tone of the discussions, and the impact on decisions (Figure 2).

Figure 2. Qualitative indicators for evaluating a publicly accessible Facebook group of a non-governmental organisation "Our Ecology"



Source: Facebook [26]

According to the study, the level of public interactivity is assessed as high. Users actively interact with the content, comment, disseminate information, and participate in discussions, which has real consequences for local decision-making.

The level of public interactivity on the Instagram platform was also assessed based on quantitative and qualitative indicators of user activity on pages related to public initiatives. The topic chosen for the study was "Waste recycling and clean environment" (Table 2).

Table 2. Assessing public interaction on Instagram

Indicator	Assessment
Quantitative indicators	
Number of comments	During the month, 600 comments were left on the profiles of NGOs under posts dedicated to environmental initiatives. The comments reflected both questions and suggestions from citizens on waste recycling.
Content distribution (sharing)	On average, 200 stories tagged with an environmental campaign or initiative were reposted by users within one month. Users also used the function of reposting posts on their profiles.
Likes and reactions	Publications related to environmental activities received an average of 800 likes and 50 reactions in the form of comments/questions to the authors.
Number of subscribers	A 10% increase in the number of followers of NGOs' accounts in a month indicates a growing interest in the topics discussed.
Qualitative indicators	
Depth of interaction	Discussions under the posts were mainly focused on specific actions: users actively shared their experience of separate waste collection, searched for information about recycling points and discussed other practical steps.
The tone of the discussion	Most comments were positive, focusing on supporting initiatives and proposals to improve the environment.
Amount of UGC (user-generated content)	Users actively created their posts using the hashtags of public initiatives (#cleanenvironment, #sortedwaste, #ecoinitiative) and increased the project's visibility by sharing content on their pages.
Influence on actions	Due to social media activity, several users joined local litter-picking events, indicating citizens' successful mobilisation through Instagram.

Source: authors' research results

The level of public engagement on Instagram is assessed as high. Users actively interact with content (likes, comments, shares), create their content, and engage others in discussions and real-life events. This indicates high interest and involvement in civic initiatives through this platform.

During the war in Ukraine (2022-2024), information threats, including propaganda, disinformation and manipulation, became a tool of hybrid warfare. These threats were aimed at destabilising the situation, undermining trust in state institutions and creating panic among citizens. Social media such as Facebook, Twitter, and Telegram became the leading platforms for dissemination, where citizen engagement increased significantly due to the importance of receiving information in real-time (Table 3).

Table 3. Analysing activity on the main media platforms in Ukraine, 2022-2024

Platform	Analysis
Telegram	There was a significant increase in channels with operational information and news from the frontline. However, at the same time, much fake news from propaganda resources was spread there, making it difficult to perceive truthful information.
Facebook and Instagram	On these platforms, citizens actively participated in discussions and news dissemination. However, a large number of emotionally charged posts and comments indicated a high level of stress and the impact of information threats. The number of calls for support for the army increased, but the number of disinformation attacks also increased.
Twitter	Fake news was spreading faster than official information, necessitating the constant intervention of fact-checkers and official sources to refute false reports.

Source: authors' observations

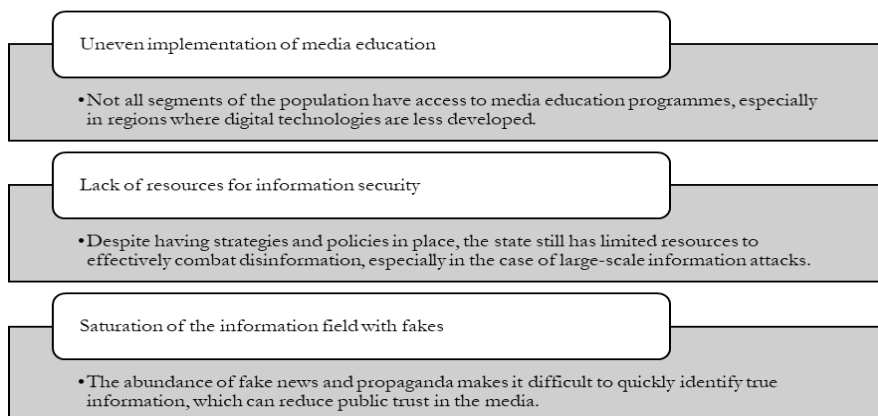
The results of the assessment of public engagement in digital media show increased participation in such forms of interaction as commenting, sharing content and participating in discussions. The data analysis showed that users increasingly express their opinions in comments under articles, videos and posts on social media platforms. Particular activity is observed when discussing socially essential topics related to politics, the environment, education and social issues.

In addition, the popularity of sharing information through personal profiles or groups is growing, demonstrating citizens' involvement in sharing knowledge and raising awareness in society. It also allows users to influence public opinion and promote more comprehensive coverage of essential issues.

Discussions take place both on official platforms and in informal groups. This activity contributes to the formation of social movements and advocacy campaigns and influences political decisions, which indicates the growing role of digital media in shaping active citizenship.

The results of the generalised assessment of the effectiveness of media education and information security policies and strategies in Ukraine demonstrate a significant impact on interactivity and public participation. Policies aimed at increasing media literacy play a crucial role in countering disinformation and fostering critical thinking, positively impacting citizens' ability to participate in public debate and consciously interact with digital media. However, there are challenges regarding the systematic and accessible nature of such initiatives and the need to adapt strategies to new information threats (Figure 3).

Figure 3. Shortcomings and challenges of effective policies and strategies in Ukraine on media education and information security



Source: compiled by the authors

Information security has also become an essential element of state policy in the context of military aggression and hybrid threats. In particular, several measures have been taken to protect the information space and combat disinformation, positively shaping a robust public position and raising public awareness. However, given the rapid development of information technologies and threats, further modernisation of these policies is needed.

In general, active implementation of media education initiatives and enhanced information security contribute to the growth of citizens' participation in political and social processes, improving their interaction with the state through digital platforms.

Ukraine is actively implementing policies and strategies to develop media education and strengthen information security, especially during times of war. The main areas are:

- Integrate curricula in schools and universities to develop critical thinking and recognise fakes, manipulation, and propaganda. Adopt state programmes to combat disinformation, propaganda, and cyberattacks. Creating the Centre for Countering Disinformation and other structures that monitor the information space plays an important role.
- Development of information verification platforms (StopFake, VoxCheck) that refute fakes and manipulations in the media space [27]. Ukraine is actively promoting media literacy education in schools and universities, which helps to raise citizens' awareness of disinformation. According to research, raising media awareness promotes a more critical attitude to information threats and reduces citizens' propensity to spread fake news.
- Projects such as Very Verified, MediaSapiens, and others promote the development of skills in recognising manipulation and fake news among different age groups. This improves the quality of interactivity on social media: the amount of disinformation spread is reduced, and the volume of constructive discussions increases [28].
- Media education campaigns help engage more citizens in disseminating verified information, which contributes to improving the media infrastructure.

Government agencies, such as the Centre for Countering Disinformation, play a key role in ensuring information security in the country. Continuous monitoring of information threats and rapid response to fakes help reduce their impact on public opinion. According to estimates, the effectiveness of government efforts to counter disinformation improves the interaction between the public and the authorities [29].

Fact-checking organisations significantly contribute to increasing the level of public interactivity. During the war, these platforms became an essential source of verified information. Social media users are more active in sharing fact-checked content and engaging in discussions to refute fakes [30].

Cooperation with international organisations, including NATO and the EU, in information security contributes to implementing best practices for protecting against information threats [31].

The level of trust in official sources of information has increased due to increased public awareness of media literacy and the introduction of mechanisms to combat fakes. This has contributed to an increase in the interactivity of citizens on social media, with more active participation in discussions related to the situation in the country. The conditions of the information war have encouraged the public to become more involved in countering information threats. Many volunteer initiatives and activists are actively disseminating verified information and helping to combat disinformation and manipulation. This increases the level of civic engagement.

Media education strategies encourage users to engage in constructive and meaningful discussions. This interactivity improves the quality of the information space and helps reduce the impact of damaging information threats.

In today's environment, ensuring more comprehensive coverage of the population with media literacy programmes, including distance learning courses and online resources, is essential. Strengthening coordination with international partners will help to apply best practices in the field of information security. Developing new platforms for prompt refutation of fakes and fact-checking will help fight disinformation more effectively.

Thus, Ukraine's media education and information security policies and strategies positively impact interactivity and public participation. Citizens are becoming more aware of information threats, which contributes to developing a better and more constructive media space. At the same time, challenges related to the uneven implementation of educational programmes and limited resources to combat disinformation exist.

DISCUSSION

To improve public interactivity, increase media literacy and ensure protection against information threats in Ukraine, it is essential to include media literacy courses in educational programmes starting from primary school to

teach children how to think critically, recognise fake information and verify sources. Organising seminars, workshops and online courses for citizens of all ages on internet safety and media analysis will help improve critical thinking and understanding of how media works.

The creation of nationwide campaigns to inform the public about the threats of disinformation and propaganda and teach critical perception of media information will help reduce the impact of fake news and manipulation, increase critical thinking, strengthen national information security, and enhance public participation. Raising awareness will encourage people to discuss important social and political issues based on verified information and help build a media-literate society.

Organising open online platforms for public discussion of political and social issues will help increase citizens' involvement in the decision-making process and help them feel the impact on public policy. Allowing citizens to receive and analyse government information in convenient formats can increase government transparency and strengthen trust in state institutions. Organising systematic measures to protect public and private resources from cyber threats should include training users, including government employees, in the basics of cyber hygiene.

Updating the legislative framework to effectively counter new information attacks, including disinformation, fake news and cyberattacks, will ensure proper accountability for disseminating harmful information. The work of the Centre for Countering Disinformation needs to be intensified, and partnership projects with media and civil society organisations need to be established to identify and refute fakes. Partnerships with civil society organisations can be expanded by creating platforms for cooperation between the state, media and civil society organisations to combat disinformation and develop media literacy jointly.

Independent media should be supported to diversify information sources and counter monopolies on information. At the same time, it is essential to develop mechanisms that allow people to easily interact with state institutions through social media and other digital platforms [32]. Regular polls, interactive discussions and the possibility to make suggestions will help to strengthen interactivity. Developing specialised online services for citizens to monitor government decisions and projects will help increase transparency and engagement.

In the context of current challenges and threats, it is advisable to create specialised centres to monitor information threats and continuously assess their impact on public opinion and interactivity. The open dissemination of reports on significant information threats will help raise public awareness of risks and help strengthen protection against them. Thus, six main recommendations should be considered to improve public engagement, increase media literacy, and protect against information threats in Ukraine (Figure 4).

Figure 4. Recommendations for increasing interactivity, media literacy and protection from information threats in Ukraine

Increasing the level of media literacy of the population	<ul style="list-style-type: none"> •Introducing media education into school and university curricula •Supporting programmes for adults •Conducting national media literacy campaigns
Development of digital platforms for citizen participation	<ul style="list-style-type: none"> •Creating interactive platforms for discussing government initiatives •Providing access to open data
Protection against information threats	<ul style="list-style-type: none"> •Development of national cybersecurity programmes •Modernisation of information security legislation •Supporting initiatives to combat disinformation
Cooperation with civil society and media	<ul style="list-style-type: none"> •Expanding partnerships with civil society organisations •Support for independent media
Enhancing citizen participation in digital media	<ul style="list-style-type: none"> •Encouraging active participation of citizens in discussions •Application of civic monitoring tools
Monitoring and assessment of information threats	<ul style="list-style-type: none"> •Regular analysis of information attacks •Publication of monitoring results

Source: compiled by the authors

Implementing these recommendations will improve public interactivity and media literacy and ensure protection against modern information threats, especially in times of war and global challenges in the information space.

CONCLUSION

Digital media have significantly expanded the opportunities for the public to participate in social processes, facilitating access to information and creating new platforms for discussing, commenting and sharing content. Citizens are increasingly exposed to disinformation, fake news and propaganda, which negatively affects the quality of public debate, reduces trust in information sources and distorts public discussion processes. The general population's lack of critical thinking skills and media literacy limits the ability to perceive and analyse information received through digital platforms effectively. To maintain interactivity and citizen participation in the face of modern information threats, systemic measures are needed to improve media literacy and protect the information space. Adequate information security and policies aimed at developing media education are vital to improving the quality of public participation and ensuring protection against information threats.

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