Fake News from the Perspectives of Technology, Economy and Security

Idlbek, Robert; Radić, Ivana; Budimir, Verica

ISSN 2718-6008

UNIVERSITY NORTH DOCTORAL STUDENTS' CONFERENCE IN MEDIA AND COMMUNICATION

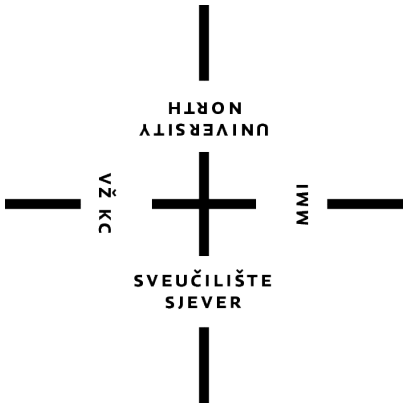
ZBORNIK RADOVA 5

—

SVEUČILIŠTE SJEVER

—

DOKTORSKA KONFERENCIJA ZA DOKTORANDE POSLIJEDIPLOMSKIH SVEUČILIŠNIH DOKTORSKIH STUDIJA IZ PODRUČJA MEDIJA I KOMUNIKACIJE



DOKTORSKA KONFERENCIJA ZA DOKTORANDE POSLIJEDIPLOMSKIH SVEUČILIŠNIH DOKTORSKIH STUDIJA IZ PODRUČJA MEDIJA I KOMUNIKACIJE

Izdavač: Sveučilište Sjever, Trg dr. Žarka Dolinara 1, Koprivnica, Hrvatska

Za izdavača: prof. dr. sc. Marin Milković

Uredništvo: Iva Rosanda Žigo
Jadranka Lasić-Lazić
Antonija Mandić

Jezična redakcija: autorska

Adresa Uredništva: Sveučilište Sjever, Trg dr. Žarka Dolinara 1, Koprivnica, Hrvatska

Grafički urednik: Anja Zorko

Dizajn naslovnice: Mario Tomiša

Tisak: Centar za digitalno nakladništvo, Sveučilište Sjever

Naklada: 100 primjeraka

ISSN 2718-6008
UDK 378.4(497.5)

DOKTORSKA KONFERENCIJA ZA DOKTORANDE POSLIJEDIPLOMSKIH SVEUČILIŠNIH DOKTORSKIH STUDIJA IZ PODRUČJA MEDIJA I KOMUNIKACIJE

Zbornik radova s Međunarodne doktorske konferencije za doktorande poslijediplomskih sveučilišnih doktorskih studija iz područja Medija i komunikacije održane u Koprivnici 23. i 24.11.2023.

Zbornik radova 5

Sveučilište Sjever
Koprivnica i Varaždin, 2024.

Organizacija

Međunarodna doktorska konferencija za doktorande poslijediplomskih sveučilišnih doktorskih studija u području medija i komunikacije održana je na Sveučilištu Sjever 23. i 24.11.2023. godine, u organizaciji Odsjeka za medije i komunikaciju.

ORGANIZACIJSKI ODBOR DOKTORSKE KONFERENCIJE:

Iva Rosanda Žigo, Marin Milković, Jadranka Lasić-Lazić, Petar Mišević, Mario Tomiša, Irena Petrijevčanin, Sonja Špiranec, Aida Slavić Overfield, Senada Dizdar, Dawid Bawden, Marko Odak, Zlatko Vidačković, Biljana Marković, Višeslav Kirinić, Ivana Radić, Antonija Mandić, Matija Kikelj, Ivan Šabić

PROGRAMSKI ODBOR DOKTORSKE KONFERENCIJE:

Marin Milković, *Sveučilište Sjever*

Jadranka Lasić-Lazić, *Sveučilište Sjever*

Iva Rosanda Žigo, *Sveučilište Sjever*

Zoran Tomić, *Sveučiliste u Mostaru*

Mario Tomiša, *Sveučilište Sjever*

Gordan Akrap, *Sveučilište obrane i sigurnosti "Dr. Franjo Tuđman"*

Aida Slavić Overfield, *UDC Consortium, Hague*

Dawid Bowden, *Universiy of London*

Dejan Jontes, *Sveučilište u Ljubljani*

Marko Odak, *Sveučilište u Mostaru*

Senada Dizdar, *Sveučilište u Sarajevu*

Veselin Kljajić, *Sveučilište u Beogradu*

Irena Petrijevčanin, *Sveučilište u Rijeci*

Sonja Špiranec, *Sveučilište u Zagrebu*

Nikolaj Lazić, *Sveučilište u Zagrebu*

Mihaela Banek-Zorica, *Sveučilište u Zagrebu*

Danijel Labaš, *Hrvatsko katalički sveučilište*

Polona Vilar, *Sveučilište u Ljubljani*

Tatjana Welzer Družovec, *Sveučilište u Mariboru*

Alenka Sauperl, *Sveučilište u Ljubljani*

Vili Podgorelec, *Sveučilište u Mariboru*

Denis Kos, *Sveučilište u Zgrebu*

Marina Mučalo, *Sveučilište u Zagrebu*

Tena Perišin, *Sveučilište u Zagrebu*

Sandra Kučina Softić, *Sveučilišni računski centar Sveučilište u Zagrebu*

Marko Tadić, *Sveučilište u Zagrebu*

Ivan Šabić, *Sveučilište Sjever*

Višeslav Kirinić, *Sveučilište Sjever*

Zlatko Vidačković, *Hrvatsko narodno kazalište, Zagreb*

Damir Boras, *Sveučilište u Zagrebu*

Koraljka Golub, *Linnaeus University*

Mirko Čubrilo, *Sveučilište Sjever*

Nives Mikelić Preradović, *Sveučilište u Zagrebu*

Jelena Jurišić, *Sveučilište u Zagrebu*

Nada Zgrabljić Rotar, *Sveučilište u Zagrebu*

Aleksandra Vraneš, *Sveučilište u Beogradu*

Kornelija Petr Balog, *Sveučilište Josipa Jurja Strossmayera u Osijeku*

Vjekoslav Afrić, *Sveučilište u Zagrebu*

Sarah Hayes, *Bath Spa University*

Hye Ran Suh. Silla University, *South Korea*

II Whan Kim, *Silla University, South Korea*

Mario Hibert, *Sveučilište u Sarajevu*

Darko Etinger, *Sveučilište u Puli*

Petar Jandrić, *Sveučilište primijenjenih znanosti, Zagreb*

Elizabeta Dadić-Hero, *Sveučilište u Rijeci*

Recenzenti:
Radovi objavljeni u zborniku prošli su dvostruko slijepu recenziju

Sadržaj

Uvodna riječ

Digitalna revolucija, razvoj umjetne inteligencije i konstantni razvoj različitih računalnih alata značajno utječu na sva znanstvena područja. Proširuju granice istraživanja, utječu na metodologiju istraživanja i pridonose potrebi redefiniranja teorijskih okvira što je, dakako, evidentno i u informacijskom i komunikacijskom području znanosti. Danas, stoga, aktualnim postaje pitanje održivosti uspostavljenih polja i disciplina unutar postojećih znanstvenih područja i polja, a kao posebno zanimljiva nameće se tema prelijevanja ne samo disciplina unutar polja, nego i između znanstvenih područja. Pitanje razvoja i evaluacije znanstvene politike kao i definiranja djelokruga istraživanja u polju, pozivaju i na preispitivanje disciplina unutar informacijsko-komunikacijskih znanosti. Navedeno, međutim, povlači još jedno pitanje, a koje je osobito važno u smislu vrednovanja istraživačkih projekata na razini Europske unije. Riječ je o klasifikaciji znanstvenih područja, polja i grana. Klasifikacija znanosti koju u Republici Hrvatskoj propisuje Pravilnik o znanstvenim područjima, poljima i granama ogledalo je i sociokulturnih razlika u odnosu na druge klasifikacije (npr. Frascati), prema kojima se određuju polja istraživanja u širem europskom kontekstu.

Zbornik radova s međunarodne doktorske konferencije za doktorande u području medija i komunikacije (*Zbornik 5*) okuplja čak 37 stručnih i znanstvenih radova nastalih u sklopu konferencije koja je pod nazivom *Informacijske i komunikacijske znanosti u kontekstu promjena* (ICS23), održana u Koprivnici u studenom 2023. godine. Događaj je osmišljen u svrhu istraživanja i rasprave o informacijskim i komunikacijskim znanostima, te je nastao kao rezultat panel rasprave održane na Sveučilištu Sjever 2023. godine na kojoj se govorilo o suvremenim tijekovima u navedenom području znanosti. Cilj je bio skrenuti pozornost na prije više od trideset godina uspostavljeno zajedništvo informacijsko-komunikacijskih znanosti, te pokušati odgovoriti na pitanje je li ono danas jače nego što je bilo u svojim začecima ili su sve znanstvene discipline ponovno u preispitivanju.

Radovi okupljeni u ovom *Zborniku* ukazuju na specifičnost znanstvenog trenutka u kojem djelujemo, ali i sugeriraju mogućnosti pokretanja i realizacije zanimljivih, međunarodno konkurentnih znanstveno-istraživačkih suradnji. Upravo iz toga razloga ovom publikacijom i nastojimo postati središnje mjesto nacionalnoga i međunarodnoga promišljanja suvremenih trendova u informacijskim i komunikacijskim znanostima, ukazujući istodobno na jedinstveni interdisciplinarni, multidisciplinarni i transdisciplinarni karakter koji obilježava cjelokupni suvremeni znanstveni milje.

U ime Organizacijskog odbora,
Iva Rosanda Žigo
Jadranka Lasić-Lazić

ROBERT IDLBEK, IVANA RADIĆ, VERICA BUDIMIR

Fake News from the Perspectives of Technology, Economy and Security

Idlbek Robert, PhD, Faculty of tourism and rural development in Pozega
Ivana Radić, phD, Požega-Slavonia Police Administration
Verica Budimir, PhD, Faculty of tourism and rural development in Pozega

Pregledni rad
UDK: 33:316-070.16

Fake news has become ubiquitous, causing severe technological, economic, and security consequences. This paper aims to analyse the problem of fake news from the perspectives of these areas and identify key challenges and opportunities to combat their spread.

The paper analyses relevant and recent literature, examining various aspects of fake news, including technological tools and platforms that enable its dissemination, economic motives behind its production and distribution, and security implications arising from its impact on society and citizens' safety.

The main research findings highlight the complexity of the fake news problem and the need for a multidisciplinary approach to address it. Technological innovations, such as algorithms for detecting fake news and improving digital literacy, can help combat their spread. Economic approaches can also positively impact, such as regulating advertising on platforms that promote fake news. Security measures, such as enhancing critical thinking and media literacy, can reduce the influence of fake news on society.

Additionally, the perspective of citizen security and the need to implement various security procedures, including police and citizen collaboration, should be considered to mitigate the impact of disinformation. In conclusion, this paper provides insights into the problem of fake news from the perspectives of technology, economy, and security, identifying key challenges and opportunities to curb their spread. A multidisciplinary approach and collaboration among various stakeholders are crucial for successfully addressing this issue and preserving the integrity of information in contemporary society.

Keywords: *fake news, technology, economy, society and security*

1. INTRODUCTION

The history of fake news can be traced through various phases. The first phase starts from antiquity and finishes in the digital age, as outlined in "A Short Guide to the History of Fake News and Disinformation" (Posetti & Matthews, 2018). The first use of fake news dates back to the Roman Empire, when Octavian led a propaganda campaign against Mark Antony. He used fake news and inscriptions on coins to damage his rival's reputation, the first known situation in history in which fake news was used to undermine someone politically.

The invention of Gutenberg's printing press (mid-15th century) impacted the spread of fake news in a whole new way. The newly invented printing press created the opportunity to machine-press papers containing fake news and efficiently distribute them to the public. One of the first significant media hoaxes was the "Great Moon Hoax" of 1835, published by the New York Sun. This hoax claimed the discovery of life on the Moon. This hoax was one of the earliest large-scale media fabrications made possible by new printing technology.

The 20th century, as Posetti and Matthews (2018) concluded, saw further dissemination of fake news through radio and television. Satirical news was sometimes misunderstood as factual. That is even nowadays present. The advent of the internet and social media in the late 20th and early 21st centuries significantly amplified those risks. As we all know, media literacy is more critical in this digital age than ever. It helps us distinguish between fact and fiction and safely consume the ever-present information. Fake news is more advanced today because it employs techniques like AI-generated text, many forms of

digital information tempering, and deepfake technology. The widespread distribution of disinformation via digital channels poses a significant threat to authentic journalism and open societies. However, as informed readers, we have the power to discern and combat fake news.

With the advent of the Internet and Web 2.0, the problem of fake news became more significant. Social media platforms such as Facebook and Twitter have enabled the rapid and wide distribution of all kinds of information, including fake news (Grbeša Zenzerović & Nenadić, 2022). The development of algorithms for content personalisation has further accelerated this process, creating so-called "information bubbles," where users are exposed only to content that confirms their pre-existing views, reducing the chance for critical evaluation of news (Bakir and McStay, 2017).

Definition of terms

Axel Gelfert (2018) defines fake news as the "deliberate presentation of (typically) false or misleading claims as news" to mislead the audience by design. The term emphasises that fake news propagates through systemic features that manipulate the audience's cognitive processes. That definition is an academic explanation of what fake news would be; however, it is worth noting that the perception of it differs significantly from the given definition when asking respondents in the Nielsen & Graves (2017) study. The study concluded that there are many views on what constitutes fake news. According to the study, audiences often perceive fake news as a spectrum rather than a distinct category, encompassing political propaganda, manipulative advertising, and biased reporting. Their research, based on focus groups and surveys, shows that fake news is broadly associated with poor journalism, political propaganda, and misleading advertising rather than fabricated stories. The study also highlights widespread scepticism towards media, politicians, and platforms, which compounds the problem of distinguishing between true and false information. Moreover, as Nielsen and Graves (2017) state, political actors have weaponised the term "fake news" to undermine the credibility of legitimate journalism.

Considering those mentioned above, this paper covers three perspectives of fake news: technology, economy, and security. Each perspective has different aims and can be backed up with numerous examples. This review explores the relationship between them, aiming to show the complexities of this phenomenon.

Technological Perspective

Technology plays a crucial role in both the spread and the fight against fake news. As concluded before, social media platforms (the primary distribution channel) use algorithms that tailor content to users based on their preferences, and users (information consumers) very often cannot distinguish between credible and fake content. Fake news spreads more quickly due to the emotional reactions it triggers, so they are achieving much higher social reach and greater visibility (Neo, 2021). Example: During the 2016 US presidential election, fake news proliferated across Facebook and Twitter, including false claims about the candidates, directly influencing voter perception.

Economic Perspective

The economy of fake news focuses on financial interests. Fake news creators often generate income by advertising on websites that spread sensational content. At the same time, platforms like Google and Facebook profit from paid clicks on ads. The economy of fake news can also have political motives, where disinformation is used to shape the political climate or change the investment climate (often measured by the Fear & Greed Index). Example: During the COVID-19 pandemic, fake news about "miracle" cures led to significant profits for people selling unsafe or untested products. These false claims cause many people to buy these products, even though they could be harmful. At the same time, this misinformation puts public health at risk because people might ignore tested supplements instead of those that are marketed as safe and effective.

Security Perspective

Fake news poses a significant security threat as it can destabilise societies and create distrust. Information manipulation is used as a tool for information warfare, and in that way threatens national security. Example: Russia's disinformation campaign during the 2014 Ukrainian crisis utilised fake news to destabilise the socio-political situation and justify its interventions in the region.

As stated before, fake news has become a complex issue. It impacts technology, the economy, and security in many ways. The abundance of information circulated across platforms has sparked severe concerns, leading to a thorough examination of its effects from different viewpoints. As we all know, technological advancements have played a role in spreading the news, mainly through social media platforms that are primary channels for disseminating misinformation (Arias, 2019; Grbeša Zenzerović & Nenadić, 2022). In this (social media) environment, fake news finds rich ground because it adjusts to pre-existing inclinations and tends to gather more engagement and advance, opening up its reach (Neo, 2021). As stated in the well-cited study, Aïmeur et al. (2023) examine the interactions between social media, social acceptance, and the impact of fake news while also discussing the creation and dynamics of influencer marketing. This study contributes significantly to the topic by demonstrating how influencers use platforms to engage their users.

Algorithms designed to optimise user engagement amplify false narratives, making a cycle of misinformation that substantially threatens the integrity of information ecosystems (Bakir & McStay, 2017). Understanding the technological foundations of fake news is crucial for developing effective strategies to counter its influence. At the same time, the economic landscape plays a significant role in sustaining the proliferation of fake news. Economic motives, such as advertising revenue and political agendas, drive the production and dissemination of misleading information and understanding the reasons behind the creation of fake news is crucial for developing ways to stop the financial benefits that support it.

As technology and the economy overlap with the spread of fake news, it is clear we need a combined understanding. As Braun and Eklund (2019) stated, the complicated link between the technology that spreads fake news and the financial motives behind it needs a detailed analysis. This point of view is vital for defining methodologies that address the complexity of the fake news problem.

This paper summarises research on the challenges and opportunities in fighting fake news. It focuses on the roles of technology, economics and security to provide a deep understanding of the complexities of fake news. The research in that area is timely as society deals with the widespread effects of misinformation on every aspect of one's life, such as public discourse, values, personal choices, and even health (School of Information Sciences, 2023). The paper explores the technologies and platforms that help spread fake news, including AI tools that detect and mitigate its impact. Also, the paper examines the economic factors behind fake news production and considers regulatory measures and financial incentives to counteract it.

2. METHODS

This literature review was carried out to gather and analyse existing research on the issue of fake news with a specific focus on its impact from technological, economic and security standpoints. The main goal was to investigate how these areas intersect and collectively influence the spread and prevention of fake news, misinformation and fraud. Since numerous references in literature are, to some extent, researching fake news, we used references available in open access that we found interesting to mention and highly positioned in the number of citation metrics.

2.1. Selection Process

The sources were chosen based on criteria, including journals, conference papers, and reputable online media sources in technology, economics, media studies, and cybersecurity. For the last five years, publications have been emphasised to ensure relevance in this dynamic research space. Studies older than five years were not considered for explaining modern trends and concepts, but a few papers older than five

years were used to explain the basic concepts of fake news, as their meaning has not changed significantly over the years.

Out of more than 200 highly relevant papers found based on the keywords, 28 were selected for this review. The papers were chosen based on their citation count and relevance to the topic.

2.2. Database Exploration

A thorough search was conducted across academic databases and digital archives such as IEEE Xplore, JSTOR, SSRN and the Digital Journalism database. Different combinations of keywords were used to find significant research papers and maximise subject matter coverage. Some of them were (but not limited to): "fake news", "misinformation," "digital literacy", "information security", "economic motivations for news accuracy", "fake news economics", "misinformation financial impact", "fake news and market manipulation", "cybersecurity and disinformation", "AI detection fake news", "social media fake news economic consequences", "information warfare economics", "fake news IT policy", and "digital trust and security".

2.3. Information Synthesis

The data gathered from the selected literature underwent analysis to identify common findings, conflicting perspectives and emerging patterns. This process included condensing points and organising them into different themes, such as technology (like AI and Blockchain), economy (such as advertising practices and economic incentives), and security (including governance and policy frameworks).

To fully understand the fake news phenomenon, we combined different viewpoints. We compared findings from technology and economics with insights from media studies and security. This approach helped to see how these areas interact and affect the issues around fake news.

3. RESULTS

3.1. Technology perspective on fake news

3.1.1. Dissemination tools and social media platforms

The advancement of IT technology has transformed the channels through which information is shared. That has impacted the proliferation of information, news, and, of course, fake news. This section explains two primary dissemination tools, social media platforms and algorithmic manipulation, as well as innovations to combat fake news.

Social media platforms are powerful tools for quickly sharing and spreading information to large audiences worldwide. Platforms such as Facebook, Twitter, and Instagram give a phenomenal reach, making them a good base for spreading fake news (Bakir & McStay, 2017; Grbeša Zenzerović & Nenadić, 2022). The way these platforms work, encouraging client engagement and sharing (social engagement), accidentally opens up the virality of true or false information. As we know, social media platforms use algorithms to show user information based on their interests. That creates an echo chamber, or information bubble, where people only see content supporting their beliefs (Eady et al., 2019; Braun & Eklund, 2019). In this environment, fake news spreads quickly because it matches people's existing beliefs and gets more attention, allowing it to reach more people (Neo, 2021). Moreover, the speed at which information circulates on social media surpasses traditional media, enabling the fast dissemination of unverified and misleading content (Friggeri et al., 2014; Appel, 2020). That accelerated pace challenges the ability of fact-checking mechanisms to keep up, allowing fake news to permeate online spaces before corrective measures can be implemented (Arias, 2019; Grbeša Zenzerović & Nenadić, 2022).

3.1.2. Algorithmic manipulation

Algorithmic manipulation represents a sophisticated part of the IT technology toolkit for disseminating fake news. Social media platforms use algorithms to bind content tailored to individual users, enhancing engagement and platform retention (Tufekci, 2014; DeVito et al., 2017). However, these algorithms can used to disseminate misinformation strategically. Algorithmic manipulation involves the deliberate tweaking of algorithms to favour the visibility of certain content over others, often driven by economic incentives or ideological motivations (Balkan & Ülgen, 2023). Bad actors take advantage of the hidden nature of these algorithms, manipulating them to ensure that fake news appears prominently in users' feeds. Automated bots further worsen the problem by artificially increasing fake news's reach and impact (DeVito et al., 2017; Hirst, 2023). These bots manage to manipulate metrics known as "social engagement" in various ways. That creates the appearance that selected fake news is read more than it actually is and can further promote it by making it go viral. Information with "organic" reach (not paid to be seen by platform users) and information promoted by bots are becoming increasingly similar, making it difficult to distinguish between organic and paid reach. Many researchers state that controlling algorithms, which promote certain content and determine where, to whom, and when it will be shown, is a crucial component in the fight against fake news. Understanding the details of the algorithms that influence the spread of particular news stories is very important, even though the public does not have detailed information about how these algorithms work.

For example, social engagement, such as liking, sharing content, or commenting, significantly affects news reach on social networks. The importance of these interactions is known. It is also assumed that texts and images not generated by AI tools are ranked higher. However, much information about algorithms remains unknown, and platforms change them daily to provide users with relevant and accurate content and optimise monetisation. Therefore, it is crucial to understand the algorithms, just as it is essential to understand the methods used by those who want to distribute fake news. These individuals exploit the complexities of social media algorithms to spread misinformation (Pennycook & Rand, 2021; Balkan & Ülgen, 2023).

One approach to combating fake news is using various artificial intelligence tools, which can identify false narratives and either flag or ban such content. With advancements in machine learning, new algorithms can analyse vast amounts of structured and unstructured data (Big Data) and, based on newly acquired knowledge, classify user-generated content according to predefined norms. For several years, Facebook has been using deep learning algorithms to detect nudity, violence, harassment, certain types of false posts, and even posts indicating that the user might be contemplating suicide. These algorithms are still evolving and could, in the future, form the basis for detecting fake news (Neo, 2021; Shu et al., 2019). Such a proactive approach allows platforms to automatically ban or pause posts until trained professionals can manually review them. Additionally, it enables the temporary or permanent locking of user accounts that disseminate inappropriate information.

Social media platforms are designed to keep users online as long as possible, arguably to show them enough paid ads and promotional texts. Users who spend much time in front of a screen become less critical, which leads to the unintentional spread of false information. Of course, this does not necessarily mean writing fake information; it can also involve liking, sharing, or commenting. As we concluded earlier, social media algorithms favour such social engagement. The desire to make more money from ads or to push particular political views can encourage the sharing of fraudulent misinformation on every platform (Bakir & McStay, 2017; Pennycook & Rand, 2021). To stop thas, it is crucial to examine the technology and the financial motivations behind it.

Innovations to combat fake news and AI algorithms

With the advancement of information and communication technology and the increasing amount of information available, a significant problem arises from users consuming this information unselectively and without a deeper analysis of its accuracy or sources. Therefore, digital literacy is essential for users to

recognise the nature of the information and become more resilient to various manipulations and frauds they are exposed to daily, so developing critical thinking in users is essential (Mroczka, 2022).

Olan et al. (2024) discuss the importance of understanding the context and interaction between social media, social acceptance (users, networks, values), and fake news. The study highlights how fake news disrupts social norms and makes distinguishing between true and false news difficult, leading to a split in societal values. The researchers emphasise the need to integrate various fact-checking tools into algorithms for detecting fake news.

As we saw earlier, AI algorithms are a practical tool in the fight against fake news. They are also offering a proactive and adaptable method for detection. These algorithms use machine learning (ML) to analyse patterns and identify unusual content that indicates deception (Neo, 2021). As AI algorithms advance, they end up progressively capable of observing nuanced components of misleading and fake user accounts. One application of AI in combating fake news is advancing deep learning (DL) models that analyse the setting and semantics of data (Shu et al., 2019; Zhou & Zafarani, 2020).

By considering the broader context in which data is presented, these models can more accurately assess the truthfulness of the content. For instance, a DL algorithm might examine the historical behaviour of a source or identify inconsistencies in the narrative that suggest potential misinformation. The dynamic nature of AI algorithms allows continuous improvement through feedback loops and ongoing training on new data (Braun & Eklund, 2019). This flexibility is vital in the fight against those spreading fake news. As phoney news tactics change, AI algorithms can continuously improve to stay ahead of new trends.

Many new technologies can further improve the validity of information sources. For example, introducing Blockchain as a potential solution is part of the broader discussion about technical interventions to address the various problems of fake news, as presented in a well-cited paper from Marbouh et al. (2020). Petratos and Faccia's (2023) thought goes beyond regular techniques. It offers a new perspective on using innovative advancements to reduce the negative economic impacts of disinformation. For example, integrating Blockchain adds a layer of resilience to today's vulnerable financial systems.

Digital literacy initiatives

While AI algorithms provide a technological defensive barrier against fake news, digital literacy initiatives are complementary and essential components of a comprehensive strategy for fighting them. These programs (initiatives) are designed to help people develop the ability to assess information thoughtfully, identify sources and spot warning signs of misinformation (Mroczka, 2022). Digital literacy extends beyond the basics of media literacy to tackle the obstacles posed by the digital era, where information spreads quickly through channels. It equips individuals with the expertise needed to navigate an evolving information environment, promoting a community better equipped to resist the impact of misinformation (Bakir & McStay, 2017). Educational programs can be tailored to different age groups and demographics, focusing on each group's challenges in the digital space (Neo, 2021).

For example, school curricula can include modules on digital literacy to teach critical thinking skills early in education. At the same time, targeted campaigns can help adults understand the dangers of misinformation and the tools they can use to verify information. Fighting fake news needs a combined effort of technology and education.

3.1.3. Economic approaches to mitigate fake news

Regulation of advertising Addressing the economic roots of fake news needs a careful approach, including regulations targeting the advertising system. Digital platforms make money from clicks and engagement, which unintentionally encourages the spreading catchy but misleading content. By regulating advertising, policymakers can introduce measures that reduce the financial support for misinformation. This Regulation can include increased transparency and stricter oversight of ad content.

One effective strategy involves enforcing stricter guidelines on verifying the accuracy of content adjacent to advertisements. Ad platforms could be mandated to implement mechanisms ensuring that ads are placed alongside credible and accurate information, mitigating the unintentional funding of misinformation (Littell, 2022).

Additionally, policymakers may explore financial penalties on platforms that host or promote ads alongside fake news content. That would create a direct economic consequence for platforms that fail to adequately vet the accuracy of content presented to users. Such penalties could serve as a deterrent, encouraging platforms to implement robust content verification mechanisms to avoid financial repercussions (Neo, 2021). Collaboration between regulatory bodies and advertising industry stakeholders is essential to develop and implement practical guidelines. Establishing industry standards for advertising practices can enhance self-regulation within the advertising ecosystem. By fostering cooperation between regulators and industry players, a more comprehensive and adaptable framework can emerge to counter the economic incentives fueling fake news dissemination.

Currently, many social media platforms have problems with fake news, and some of the most used are even facing bans. For example, TikTok is facing significant challenges in handling fake news and misinformation on its platform. A recent study shows that TikTok approved all 16 fake ads submitted by the international campaign group Global Witness, which included misleading content about the European Union elections. For a difference, YouTube and X (formerly Twitter) caught most false ads. TikTok attributed those approvals to a "human error" (The Business Standard, 2024).

Moreover, TikTok has been criticised for its role in spreading COVID-19 misinformation more than every other social network, like FB, Twitter, and others. Research has shown that its unique micro-video format makes detecting and combating deceptive information more difficult. Some studies show that individuals against COVID-19 have been using hidden messages and hashtags (#) to get around detection and share false information. They shared misinformation about the vaccine's safety and potential side effects (School of Information Sciences, 2023). After that, TikTok announced its strategy to combat misinformation about elections. They prohibited political advertisements and started to work in collaboration with fact-checking groups. Moreover, the platform aims to provide comprehensive reports on efforts to influence opinions to promote transparency, according to an article by Engadget in 2024 (Engadget, 2024). Of course, other platforms like TikTok are also having global problems.

3.1.3.1. Economic incentives for accurate reporting

Complementing regulatory measures and economic incentives for accurate reporting represents a strategy to reshape the current situation. Introducing mechanisms that reward accuracy and responsible journalism can counteract the economic motivations that motivate fake news production. One promising approach involves creating economic incentives for news organisations and content creators to prioritise accuracy over sensationalism. Financial rewards or subsidies can be given to information publishers to follow strict fact-checking standards and provide reliable information. These incentives would support media organisations or platforms that distribute news and information to the public. That can include newspapers, TV, radio stations, websites, podcasts and other media that provide content to the audience. This approach promotes truthful reporting and high-quality journalism (Littell, 2022).

Public funding or grants supporting investigative journalism can also help promote accurate reporting. By providing resources to news organisations committed to truthfulness and Accountability, policymakers can help ensure the economic sustainability of responsible journalism. This approach acknowledges that quality journalism is a public good that deserves support to counteract the financial pressures favouring sensationalism (Vasu et al., 2018). This partnership can create programs that support accurate reporting and uphold journalistic integrity. Using both sectors' expertise, policymakers can develop programs encouraging accurate reporting. They can be nuanced and adaptable to effectively support quality journalism without compromising journalistic independence.

Involving media professionals in creating these incentives ensures a realistic understanding of the industry's challenges, and as we saw, addressing fake news requires a multifaceted strategy. This strategy should combine regulatory measures with positive economic incentives for accurate reporting. Regulating advertising aims to disrupt the economic system that supports misinformation by penalising platforms that fund fake news. At the same time, economic incentives for accurate reporting encourage journalistic integrity by rewarding publishers that provide reliable information. By combining these approaches, policymakers can create a more robust economic foundation for sharing accurate information.

3.1.3.2. Integration of Technological and Economic Aspects

Fake news challenges understanding the link between technology and economic motivations. Technology and the economy influence each other in many ways. Social media platforms are good examples of this relationship. These platforms are designed to connect people and share information. However, they often become channels for spreading misinformation quickly (Braun & Eklund, 2019). The business model under these platforms, reliant on user engagement for revenue generation, to some extent, amplifies the spread of attention-grabbing (and misleading) content (Littell, 2022). Algorithmic manipulation further complicates this relationship by introducing a layer of sophistication to disseminating fake news. Bad actors strategically exploit algorithms to ensure the prominence of misleading narratives, using the algorithms' design to maximise user engagement (Hirst, 2023). The technology that powers algorithms facilitates the rapid spread of misinformation and becomes a tool for those with economic motives to manipulate and amplify their influence.

Examining the economic perspective reveals a relationship where economic incentives shape technological landscapes. The revenue models of digital platforms, often based on advertising, create unintentional incentives for producing and disseminating sensationalised and misleading content. This economic motivation influences the design and functioning of platforms, inadvertently favouring the virality of content over its accuracy (Neo, 2021). As many researchers concluded earlier, understanding the link between technology and the economy is critical to fighting fake news. Tools meant to spread information often help misinformation because of their economic foundations. Recognising this complex relationship is crucial for creating effective solutions.

3.1.3.3. Collaborative strategies to address challenges in both domains

Fighting fake news requires everyone to work together, including policymakers, industry leaders, and tech developers. They need to create robust strategies that address both technological and economic factors:

- Social media platforms should make their algorithms clear and open to outside checks. That can help stop fake news from spreading unnoticed (Balkan & Ülgen, 2023).
- Policymakers and industry leaders should work together to create and enforce rules that reduce the financial benefits of spreading fake news. That includes ensuring ads are placed next to truthful content and penalising platforms that host misleading ads (Neo, 2021).
- Tech developers should design technologies with ethics in mind, considering their impact on society and minimising adverse consequences (Littell, 2022).
- Education programs should teach people how to evaluate information online critically. These programs, developed by educators, tech experts, and policymakers, can help individuals recognise and resist misinformation (Mroczka, 2022).
- Economic strategies should reward accurate journalism. Partnerships between the public and private sectors can offer financial incentives to digital platforms that follow strict fact-checking standards (Littell, 2022).

By collaborating and understanding the link between technology and economic motives, we can find practical solutions to combat fake news. Policymakers, industry leaders, and tech experts must work together to build a robust framework addressing these challenges in our digital and economic systems.

4. DISCUSSION

This section examines the intersections of technological, economic, and security challenges of fake news, providing a foundation for the focused analysis in the subsequent subsections.

4.1. Key findings

Based on the analysed literature, several conclusions can be drawn regarding fake news's technological, economic, and security impacts.

4.1.1. Technological Influence on Fake News Dissemination

- Social networks and digital platforms that allow users to independently create, publish, and share information have become primary sources of information for users. The more time users spend on these platforms, the less analytical they become, creating fertile ground for the spread of fake news through social engagement.
- Information dissemination on these platforms is based on algorithms defined by the mostly secret platforms. The parameters influencing the visibility of articles, texts, or images to other users are not well-known and are constantly adjusted. Some initiatives advocate for audits and embedded mechanisms in these algorithms to prevent the spread of fake news.
- Currently, many mechanisms, primarily based on bots and fake users, artificially increase the visibility of specific content that other users would otherwise not see.
- Technologies for analysing large amounts of data (big data) and pervasive AI and machine learning algorithms have made significant progress in recent years. Especially notable is the advancement in language models that can detect false narratives and information unsuitable for distribution, creating preconditions for applications in detecting fake news through content and user behaviour analysis on specific platforms.
- Applying technologies like Blockchain, based on cryptographic solid foundations, can help detect valid data sources and distinguish them from potentially false ones.
- Although not directly related to technology, understanding technology and interaction methods on platforms through various educational models in the "information literacy" field is necessary for users of all levels and ages.

4.1.2. Economic Influence on Fake News Dissemination

- Financial incentives obtained through various forms of paid content display, as opposed to organic display, are strong motivators for generating and publishing fake news. Eliminating these mechanisms or placing them under greater control could make creating fake news financially unviable.
- Stricter regulatory measures for digital platforms and social networks are proposed to reduce fake information. Policies requiring transparency and Accountability in ad placement, alongside financial penalties for platforms that host misleading ads, can reduce the profitability of fake news.
- Financial compensation for accurate reporting could be one of the measures imposed to combat fake news. Such compensation could strengthen fact-checking mechanisms and create a distinction between media that publish quality, accurate content and those that do not.

4.1.3. Security Implications of Fake News

- Fake news poses significant risks to all citizens. People exposed to fake news may make decisions based on incorrect facts, which can be detrimental, even fatal, to society's economic, social, and political aspects.
- Effectively stopping fake news requires the collaboration of all stakeholders, not just the users who consume it. Coordination between police, security agencies, and citizens is necessary to protect society and individuals from fraud and other fake news.

4.2. Recommendations

Based on previous literature, several recommendations can be made regarding better recognising and combating fake news. These can be outlined as follows:

- The approach to solving the fake news problem must include many aspects, encompassing economic, information and communication technology, and political dimensions. One effective way to eliminate many fake news items is to prevent their monetisation. A clear global strategy is required for this purpose.
- Transparency and Accountability for published information are more critical than ever. Therefore, it will be necessary to jointly work on measures that include various audits and certification of algorithms for managing posts on digital platforms and social networks. Furthermore, ways must be found to disincentivise sources that have proven to publish incorrect information economically. That will naturally reduce the number of published fake news items, negatively impacting platforms' financial revenues. Hence, a balance that is sustainable and socially acceptable in the long term needs to be found.
- Education programs for digital literacy need to be developed and implemented to enable individuals to independently recognise fake news and various other forms of threats. These programs should be integrated into formal education curricula and include targeted campaigns for adults, enhancing critical thinking skills and resilience to misinformation.
- Collaborative economic strategies should be employed to incentivise responsible journalism to counter the economic motivations behind fake news. Public-private partnerships can introduce financial rewards or subsidies for digital platforms that adhere to fact-checking standards and consistently provide accurate information. By creating economic incentives for accuracy, this approach promotes a shift toward responsible reporting, reducing the appeal of sensationalised misinformation.
- Cross-sector collaboration is fundamental to attaining comprehensive arrangements. Policymakers, innovation designers, teachers, and industry partners should lock in progressing exchange and collaboration. Setting up gatherings for communication and knowledge-sharing guarantees that intercessions stay versatile to the advancing fake news scene. This collaborative approach encourages the advancement of all-encompassing procedures that address mechanical vulnerabilities and financial motivating forces.
- Continuous investment in research and development is crucial to avoiding emerging challenges related to fake news. Governments, private organisations, and professors should collaborate to support finding modern and advanced techniques for combating misinformation and fraud.

These recommendations address primarily the technological and economic aspects of fake news. However, the perspectives and approaches to combating fake news are inherently broad.

5. CONCLUSION

In wrapping up this research into the ever-present world of fake news, it is clear that this problem takes more work. A detailed plan must be made to examine technology's new challenges and the financial interests that drive the spread of false information. Literature research shows how social media, designed to connect people and share information quickly, can also speed up the spread of fake news. That happens because the systems that decide what we see online often push sensational stories, making it easier for false information to travel far and wide. These systems and algorithms can also be manipulated, allowing some people to spread fake news on purpose. On the financial side, we have seen two main reasons why fake news keeps becoming increasingly problematic: it can make money through ads and be used to achieve specific political goals. Digital platforms' ability to make money by keeping users online and engaged can encourage the spread of eye-catching but false stories. Political motives make the situation even more complicated, as financial and political goals mix, using fake news as a tool.

To effectively fight fake news, we suggest a wide-reaching plan that involves many different areas: technology, law, education, and finances. That includes clarifying how online systems work, changing how

online ads are regulated, teaching people how to spot fake news, supporting good journalism, promoting ethical practices in technology design, setting standards for online platforms, working together across different sectors, and investing in new solutions.

The fight against fake news, like technology and the economy, constantly changes. So, it is important to keep researching and be ready to change how we use information. To make a difference, everyone involved needs to focus on innovation and teamwork, breaking down barriers between different fields of study.

REFERENCES

1. Aïmeur, E., Amri, S., Brassard, G. (2023). Fake news, disinformation and misinformation in social media: a review. *Social Network Analysis and Mining, 13(1), 30.*
2. *Appel, G., Grewal, L., Hadi, R., Stephen, A. T. (2020). The future of social media in marketing. Journal of the Academy of Marketing Science, 48(1), 79-95.*
3. *Arias, M. (2019). Understanding Fake News: Technology, Affects, and the Politics of the Untruth. Historia y Comunicación Social, 24(2), 533-546.* https://doi.org/10.5209/hics.66298
4. Bakir, V., McStay, A. (2017). Fake News and The Economy of Emotions. *Digital Journalism, [online] 6(2), pp.154–175. doi: https://doi.org/10.1080/21670811.2017.1345645.*
5. *Balkan, E., Ülgen, S. (2023). A PRIMER ON MISINFORMATION, MALINFORMATION AND DISINFORMATION. Retrieved from* https://edam.org.tr/uploads/yukleme_resim/Report-Disinformation-Malinformation-Misinformation.pdf
6. Braun, J. A., Eklund, J. L. (2019). Fake News, Real Money: Ad Tech Platforms, Profit-Driven Hoaxes, and the Business of Journalism. *Digital Journalism, 7*(1), 1-21. https://doi.org/10.1080/21670811.2018.1556314
7. DeVito, M. A., Gergle, D., Birnholtz, J. (2017). "Algorithms ruin everything" # RIPTwitter, Folk Theories, and Resistance to Algorithmic Change in Social Media. In *Proceedings of the 2017 CHI conference on human factors in computing systems* (pp. 3163-3174).
8. Eady, G., Nagler, J., Guess, A., Zilinsky, J., Tucker, J. A. (2019). How many people live in political bubbles on social media? Evidence from linked survey and Twitter data. *Sage Open, 9(1), 2158244019832705.*
9. *Engadget. (2024). TikTok details its plan to counter election misinformation in 2024. Retrieved from* https://www.engadget.com/tiktok-details-its-plan-to-counter-election-misinformation-in-2024-150040486.html?src=rss
10. Friggeri, A., Adamic, L. A., Eckles, D., Cheng, J., Hartline, J. D. (2014). Rumor Cascades. *Proceedings of the Eighth International Conference on Weblogs and Social Media (pp. 101-110).*
11. Gelfert, A. (2018). Fake news: A definition. *Informal logic*, *38*(1), 84-117.
12. Grbeša Zenzerović, M., Nenadić, I. (2022). Jačanje otpornosti društva na dezinformacije: Analiza stanja i smjernice za djelovanje.
13. Hirst, M. (2023). Towards a political economy of fake news. Retrieved from http://www.polecom.org/index.php/polecom/article/viewFile/86/288
14. Littell, J. (2022). The Future of Cyber-Enabled Influence Operations: Emergent Technologies, Disinformation, and the Destruction of Democracy. *In The Future of Cyber-Enabled Influence Operations (pp. 197-227).* https://doi.org/10.1007/978-3-031-04586-8_10
15. Marbouh, D., Abbasi, T., Maasmi, F., Omar, I. A., Debe, M. S., Salah, K., Ellahham, S. (2020). Blockchain for COVID-19: review, opportunities, and a trusted tracking system. *Arabian journal for science and engineering, 45, 9895-9911.*
16. Mroczka, K. (2022). Fake news as a new category of threat to the system of economic security of the state in the era of epidemic crisis. *Przegląd Bezpieczeństwa Wewnętrznego, 14*(26), 337-377. Retrieved from https://www.ceeol.com/search/article-detail?id=1084074
17. Neo, R. (2021). The International Discourses and Governance of Fake News. *Global Policy, 12*(2), 214-228. https://doi.org/10.1111/1758-5899.12958
18. Nielsen, R., Graves, L. (2017). 'News you don't believe': Audience perspectives on fake news. *Reuters Institute for the Study of Journalism, 37*(5). Retrieve, F., Jayawickrama, U., Arakpogun, E. O., Suklan, J., Liu, S. (2024). Fake news on social media: the impact on society. *Information Systems Frontiers, 26*(2), 443-458.
19. Olan, F., Jayawickrama, U., Arakpogun, E. O., Suklan, J., & Liu, S. (2024). Fake news on social media: the impact on society. *Information Systems Frontiers, 26*(2), 443-458.
20. Pennycook, G., Rand, D. G. (2021). The psychology of fake news. *Trends in cognitive sciences, 25*(5), 388-402.
21. Petratos, P. N., Faccia, A. (2023). Fake news, misinformation, disinformation and supply chain risks and disruptions: risk management and resilience using Blockchain. *Annals of Operations Research*. https://doi.org/10.1007/s10479-023-05242-4
22. Posetti, J., Matthews, A. (2018). A short guide to the history of 'fake news' and disinformation. *International Center for Journalists*, *7*(2018), 2018-07.
23. School of Information Sciences. (2023). New study reveals TikTok's spread of COVID-19 misinformation. Retrieved from https://ischool.illinois.edu/news-events/news/2023/06/new-study-reveals-tiktoks-spread-covid-19-misinformation
24. Shu, K., Mahudeswaran, D., Wang, S., Lee, D., Liu, H., Wang, S. (2019). FakeNewsNet: A Data Repository with News Articles, Social Feedback, and Platform Data. *arXiv preprint arXiv:1906.01227*.
25. The Business Standard. (2024). TikTok fails 'disinformation test' before EU vote, study shows. Retrieved from https://www.tbsnews.net/worldbiz/europe/tiktok-fails-disinformation-test-eu-vote-study-shows-868051
26. Tufekci, Z. (2014). Big Questions for Social Media Big Data: Representativeness, Validity and Other Methodological Pitfalls. *ICWSM*, 505-514.
27. Vasu, N., Ang, B., Jayakumar, S., Faizal, M. and Ahuja, J. (2018). FAKE NEWS: NATIONAL SECURITY IN THE POST-TRUTH ERA Policy Report. [online]

Available at: http://journres1.pbworks.com/w/file/fetch/145878072/Fake_News_National_Security_in_the_Post.pdf.

28. Zhou, X., Zafarani, R. (2020). A survey of fake news: Fundamental theories, detection methods, and opportunities. *ACM Computing Surveys (CSUR), 53*(5), 1-40.

SUMMARY

Lažne vijesti iz perspektive tehnologije, ekonomije i sigurnosti

Lažne vijesti su postale sveprisutne u suvremenom društvu, izazivajući ozbiljne posljedice na područjima tehnologije, ekonomije i sigurnosti. Ovaj rad ima za cilj analizirati problem lažnih vijesti iz perspektive navedenih područja te identificirati ključne izazove i mogućnosti za suzbijanje njihovog širenja.

U radu se analizira relevantna i recentna literatura, a analiziraju se različiti aspekti lažnih vijesti, uključujući tehnološke alate i platforme koje omogućavaju njihovo širenje, ekonomske motive koji stoje iza njihove proizvodnje i distribucije te sigurnosne implikacije koje proizlaze iz njihovog utjecaja na društvo i sigurnost građana.

Glavni rezultati istraživanja ukazuju na kompleksnost problema lažnih vijesti i potrebu za multidisciplinarnim pristupom u njihovom suzbijanju. Tehnološke inovacije, kao što su algoritmi za prepoznavanje lažnih vijesti i poboljšanje digitalne pismenosti, mogu biti korisne u borbi protiv njihovog širenja. Ekonomski pristupi, poput regulacije oglašavanja na platformama koje promoviraju lažne vijesti, također mogu imati pozitivan učinak, a sigurnosne mjere, poput jačanja kritičkog razmišljanja i medijske pismenosti, mogu smanjiti utjecaj lažnih vijesti na društvo. Tome treba dodati i perspektivu sigurnosti građana te potrebu za uvođenjem različitih sigurnosnih procedura koje, između ostalog, uključuju suradnju policije i građana kako bi se utjecaj dezinformacija smanjio.

Zaključno, ovaj rad pruža uvid u problem lažnih vijesti iz perspektive tehnologije, ekonomije i sigurnosti te identificira ključne izazove i mogućnosti za suzbijanje njihovog širenja. Multidisciplinarni pristup i suradnja između različitih dionika su ključni za uspješno suočavanje s ovim problemom i očuvanje integriteta informacija u suvremenom društvu.

Ključne riječi: *lažne vijesti, tehnologija, ekonomija, društvo i sigurnost*