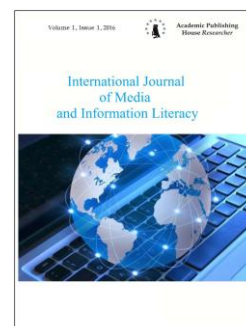


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How Fake News Spreads Online?

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Abstract

Permeating the Internet and reaching millions of users, fake news became a pervasive phenomenon on the public agenda since the US Presidential election in 2016. The term, despite its ambiguity, has been widely used in research to describe false messages created with the intent to mislead. However empirical evidence on how fake news spreads and circulates between individuals and different social groups remains limited.

For this literature review, I collected 21 academic articles published in English between 2016 and 2020 that explore the audience of fake news, patterns of its dissemination, and the role played by average users and bots in this process. The reviewed studies sometimes arrive at contradictory conclusions regarding important aspects of the focal phenomenon: for example, authors differently evaluate the scale of it and reach opposing conclusions studying the influence of bots on the fake news spread. Moreover, I observe certain contextual imbalances: many papers focus on the US political agenda and collect data from Facebook or Twitter, all but neglecting other digital platforms where disinformation can circulate.

In this paper, I argue that future research needs a systematic exploration of users' motivations to share fake news and more precise look into the role of media in misinformation dissemination. It is also important to compare the spread of fake news within different political contexts and media systems to explore how local peculiarities affect its circulation.

Keywords: fake news, misinformation, social media, information behaviour, online communication, disinformation.

1. Introduction

The concept of “*fake news*” is widely used in the media to describe fabricated news or rumors. Despite its ambiguity and negative connotation, the term was adopted by academia as well to describe the modern form of online disinformation. It has been popularized after the 2016 US Presidential elections, although the phrase itself has been known before (OED Online, 2020).

Most scientific interpretations emphasize two crucial aspects of this phenomenon that distinguish it from falsehood in general. First of all, this information is created with the intention to deceive (Allcott, Gentzkow, 2017: 213; Gelfert, 2018: 86). Secondly, it “mimics news media content in form but not in organizational process or intent” (Lazer et al., 2018: 2).

Fake news appears on the Internet in various forms. In studies conducted between 2007 and 2017, this term was conceptualized in six different ways: news satire, news parody, fabrication, manipulation, propaganda, and advertising (Tandoc, Ling, 2017). Authors of this research review emphasize that if traditional news is a product of journalism, fake news is “co-constructed by the

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audience” because its “fakeness” depends on whether the audience believes it or not (Tandoc, Ling, 2017: 148).

However, the concept of fake news has much broader interpretations among the general public than among scholars. For example, the term has been used in reference to tendentious news coverage, partisan rhetoric, or outrageous statements made by politicians (Nielsen, Graves, 2017: 1–2). According to S. Waisbord (Waisbord, 2018: 1868), the fake news phenomenon itself is “symptomatic of the collapse of the old news order and the chaos of contemporary public communication”.

Some scholars, like C. Wardle and H. Derakhshan, even refrain from using the term “fake news” and argue that it has become too politicized, as it has been appropriated by politicians to describe media organizations oppositional to them (Wardle, Derakhshan, 2017: 5). To address the problem of informational misconduct online they suggest a different categorization: misinformation (spreading false information without intention to deceive), disinformation (spreading false information with an intention to deceive), and malinformation (spreading true information with an intention to deceive).

In this research review, however, I will settle on the term “fake news” because despite its controversial nature it reflects a particular socio-cultural phenomenon of the contemporary public sphere. Following the definitions mentioned above, I use the term “fake news” for *false information mimicking traditional news that is created and spread with an intention to deceive*. Thus, I do not apply it to the cases where the phrase is used only as a figure of speech or to discredit journalists or politicians.

Some scholars claim that fake news, often tied to conspiracy theories, not only misinforms people but also affects “the overall intellectual well-being of a society” (Lewandowsky et al., 2017: 355). Fake stories often accompany major political events but they spread far beyond just political context. In 2020, fake news became a significant part of the COVID-19 pandemic coverage and contributed to the rise of what the World Health Organization (WHO, 2020) labelled an “infodemic”, where true messages circulated alongside false ones. According to the Reuters Institute for the Study of Journalism, fake news about coronavirus has been spread both by average users and by politicians, celebrities, and other public figures (Brennen et al., 2020).

Fake news has been explored from various perspectives. Previous studies looked at the perception of fake news (see, for example, Pennycook, Rand, 2019), its potential political effects (see, for example, Balmas, 2014), and various solutions to fight misinformation such as warning labels (see, for example, Garrett, Poulsen, 2019) or automated recognition (see, for example, Zubiaga et al., 2018; Zhang, Ghorbani, 2018). However, the extant investigations of how fake news interferes with the public sphere (including online social networks) seem to us quite fragmented and heterogeneous.

The goal of this article is to summarize the main research findings on the fake news dissemination online. Here I analyze studies that provide empirical evidence on the following aspects of fake news circulation: actors spreading this content, its audience, mechanisms and patterns of dissemination, and reasons why average social media users are willing to share fake stories. In this review, I aim not only to synthesize existing scholarship but also to highlight gaps that should be addressed by future research to gain a better understanding of the fake news phenomenon.

2. Materials and methods

Fake news dissemination is a complex process. An analytical model suggested by F. Giglietto, L. Iannelli, A. Valeriani, and L. Rossi (Giglietto et al., 2019) divides this process into three levels: micro-level (criteria for news truthfulness judgment and decision to share falsehood), meso-level (possible relations between judgments and decisions), and macro-level (the process of false news propagation). Partly in line with this model, the present paper looks at fake news spread from different angles – from a structural perspective (mechanisms and patterns of dissemination) to individual aspects (reasons why people share fake news).

This review examines 21 papers indexed in the Scopus database that had been published between 2016 and 2020. Selected studies answer one of the following research questions: (1) how fake news spreads online? (2) what are the differences in the dissemination of fake and true news? (3) who spreads fake news? (4) what factors influence users’ willingness to share fake news?

On the stage of paper selection, I used search queries based on the following phrases: “fake news dissemination”, “fake news spread”, “fake news circulation”, “fake news diffusion”, “fake news sharing”, “fake news propagation”. Overall 984 search results were obtained. The final selection has been made after narrowing it down on each of several steps: (1) scanning through titles; (2) reading abstracts of the relevant articles; (3) looking through texts; (4) checking some of the bibliographies. The collection of selected papers mostly consists of quantitative studies however there are a few articles using qualitative and mixed-method approaches.

3. Discussion

Fake news spreads through a complex ecosystem of websites, social networks, and bots (Lazer et al., 2017: 7). Some studies made an attempt to estimate the audience reach of fake news. For example, S. Vosoughi, D. Roy, and S. Aral (Vosoughi et al., 2018) collected 4.5 million tweets posted between 2006 and 2017 and found that fake news has been spreading farther, faster, deeper, and more broadly than true information. In this study, scholars examined networks of tweets as information cascades. The number of cascades corresponded to the number of times a story or claim was independently posted by the user; the size of a cascade was equal to the number of retweets, and the depth was quantified based on the number of hops (retweets by unique user) over time. According to this study, at every depth of a cascade false rumors reached more people than true stories, which means that they were retweeted more often. True posts rarely spread among more than 1000 people, whereas top posts with fake news could easily reach 1000–10,000 users.

The observation that fake news spreads more broadly than true news is supported by another study. A. Pal and A.Y.K. Chua (Pal, Chua, 2019) traced the dissemination of 20 false and 20 true posts about the 2016 US Presidential election that made claims looking like news. Tweets were selected randomly and fact-checked. Their analysis showed that fake news had 4.57 times more tweets than true stories.

Nevertheless, other evidence suggests that even though fake news has a significant reach, it is still rather small in comparison to traditional news. Such outcomes were presented in the study conducted by H. Allcott, M. Gentzkow, and C. Yu (Allcott et al., 2019) who investigated the dissemination of nearly 10,000 fake stories on Facebook and Twitter and compared their reach to different sources, including major media outlets. While 569 fake news websites accounted for around 3–4 million retweets a month, 38 major news websites had 20 million shares. On Facebook, false content garnered 160 million engagements a month on its peak (the sum of shares, comments, and reactions) whereas news media had on average 200–250 million. Thus, several dozens of media outlets outperformed several hundreds of fake news websites. Moreover, by the end of 2016 fake news engagements on Facebook decreased by more than 50 %. Scholars believe it to be the result of the measures against misinformation introduced by the social media company. However, I could also suggest that disinformation followed the election and, therefore, dropped after its conclusion.

Scholars who studied Twitter-accounts of American voters during the election in 2016 suggest that the audience of fake news is very concentrated (Grinber et al., 2019). 80 % of fake news was seen by only 1 % of the accounts in the sample and shared by 0.1 % of them. Meanwhile, fake news dissemination was concentrated not only around users but also around sources since seven top fake news websites generated half of the overall exposures. Similar conclusions were reached by J.L. Nelson and H. Taneja (Nelson, Taneja, 2018) who compared engagement (amount of time spent on the website) of 30 news media to 24 fake news websites. Scholars presume that fake news consumers represent the small group of “heavy Internet users” (Nelson, Taneja, 2018: 3721). Real news sites had 40 times more visitors and twice as large engagement rate than fake news sites. Moreover, the research found that fake news sites collectively reached a smaller audience than more than half of the real news sites individually.

One of the distinct features of fake news is the patterns of its dissemination. In the study that was already mentioned (Pal, Chua, 2019), it was found that the volume of real news posts drastically dropped after the first 24 hours, however fake news could actively disseminate for at least four days. Other scholars investigated the circulation of 17 political rumors (13 false and 4 correct) during the year of 2012 Presidential elections (Shin et al., 2018). The study found that false rumors frequently came back to the public agenda and had multiple peaks of diffusion whereas true stories normally had just one spike. Moreover, false rumors changed over time –

for example, they reemerged with a new focus or new details. Researchers conclude that spread of misinformation may involve the same campaign tactics that are employed by some media professionals and activists seeking political power (Shin et al., 2018: 284).

Aside from the dynamics of dissemination, fake news has other specific traits such as message organization. A study of misinformation in Ukraine provides a comparison of four datasets of tweets that contained both fake and true news (Kumar et al., 2020). It found that fake news tends to contain more mentions (presumably for dissemination within the community) and hashtags (presumably for dissemination outside the community). The necessity to mention other users in posts can be related to the fact that fake news is often posted by unverified social media accounts with a small number of followers. A study of a so-called “Twitter-bomb” – an organized effort to spread misinformation about the politician Martha Coakley who ran for a US Senate seat in the 2010 Massachusetts election – revealed that misinformation mostly spread through the replies to other Twitter users (Mustafaraj, Metaxas, 2017). Scholars found that almost 25 % of users who received such tweets retweeted it. They estimated the overall volume of misinformation about the candidate to be nearly 62.000 tweets.

Researchers specify several actors that can be responsible for fake news dissemination. According to one of the classifications these are bots; criminal and terrorist organizations; governments; journalists; activist or political organizations; trolls and paid posters; “useful idiots” (people manipulated by someone else); conspiracy theorists and true believers; and individuals that somehow benefit from misinformation (Zanettou et al., 2019: 3–4). I can divide these actors into two more general groups of fake news spreaders: 1) creators, or those who initially produce false messages to achieve certain goals; 2) “retransmitters”, or users who share these messages not necessarily knowing that they are false. Bots, in this case, are not independent actors, but propagation tools.

However, it is not clear whether fake news reaches most of the audience because of trusting users who share it or due to the bot activity controlled by fake news creators. A number of studies made an attempt to evaluate the role of bots in misinformation diffusion, and the obtained results are rather contradictory. A. Bovet and H.A. Makse (Bovet, Makse, 2019) who examined nearly 30 million tweets before the US elections found that automated accounts spread fake news more actively than other types of news which proves the presence of bots in this process. Scholars also determined that fake news has similar dissemination patterns to the extremely biased news (especially extremely right) but different from true and more neutral news. For instance, while top spreaders of center and left-leaning news are mostly journalists, media outlets, and public figures, fake news and extremely biased news are also often posted from unknown and unverified accounts. Despite that, according to the study, fake and extremely biased news spreaders are more active and connected to others than users in traditional media networks.

Nonetheless, previously mentioned S. Vosoughi, D. Roy, and S. Aral came to contrary results (Vosoughi et al., 2018). They found that accounts spreading false news have significantly fewer followers and subscriptions, they are less active and more rarely verified than accounts posting true news (Vosoughi et al., 2018: 4). However, as already noted, fake news still spreads faster, deeper, and more broadly. Trying to explain this paradox, scholars conclude that actual users – and not bots – are responsible for the fake news dissemination in the first place because such stories attract human attention. Bots, according to the researchers, spread false news and true news in similar amounts and with the same effect, thus they cannot explain the wide propagation of fake news.

Another model of fake news diffusion was built on the sample of tweets made during the period of 2016 US Presidential election (Shao et al., 2018). It consists of two segregated clusters – fake news and fact-checking – where nodes represent Twitter accounts spreading the news and edges represent connections between two users who exchanged information (through replies, mentions, or citations). The authors found evidence of higher bot activity in the main core of the network than on the periphery. According to the study data, 75 % of the accounts spreading fake news belonged to real users, and the rest was classified as bots. However, researchers conclude that bots also influence the behavior of real users, since 25 % of the retweets in the main core were classified as humans retweeting bots.

Apart from bots, there is another technological factor that is possibly involved in the fake news diffusion: algorithms. Critics fear that suggesting relevant content to social media users, algorithms can create filter bubbles based on a person's interests (Pariser, 2011). However, some

scholars believe that in case of fake news algorithms do not produce filter bubbles per se but rather consolidate users' information behavior (Zimmer et al., 2019), and, therefore, they are not solely responsible for the disinformation diffusion. Thus, as stated by the authors, users and their cognitive patterns remain the key element in the fake news diffusion.

The decision to share news online is influenced by multiple factors, which, according to the existing research, are not limited just to the news trust. In their study based on the 20 semi-structured interviews with college students, L. Wang and S.R. Fussell (Wang, Fussell, 2020) specify three stages of news sharing. Firstly, users assess content in terms of a source, relevance, and perceived interest to others. Secondly, before posting, they think of the appropriate audience for this piece of information. Finally, after sharing, users analyze the feedback. Although, according to the authors, how and if users engage in all of these stages also depend on their level of cognitive processing, motives for sharing, and group or community norms (Wang, Fussell, 2020: 15). Thus, willingness to share news is shaped by three different factors: attitude towards the content, expected reaction, and personal traits of a user.

M. Koohikamali and A. Sidorova (Koohikamali, Sidorova, 2017) point out that risk-taking propensity and enjoyment from information influence an intention to share it. Furthermore, authors of the qualitative study based on 12 focus groups with 88 participants from Singapore found that desire to share news is related to "emotional impact, relevance, and the intention to provide advice or warning" (Duffy et al., 2019: 10). Scholars also mention that people could unintentionally share fake news because of the pressure to engage in social activity, however, it would be perceived as a somewhat risky behavior because accidental posting of fake news can cause negative feedback from other users.

Some studies explored psychological characteristics that may lead to fake news sharing. One of them analyzed data of 1022 WhatsApp users and revealed that sharing fake news is positively associated with online trust, self-disclosure, fear of missing out, and social media fatigue and negatively – with social comparison (Talwar et al., 2019). Scholars explain that users with social media fatigue are less inclined to fact-check information and may share fake news (also unintentionally) because it is an easy way to maintain social media activity. On the contrary, users who have a disposition to social comparison, according to the researchers, are more concerned about their online image and avoid sharing fake news since it can harm their reputation (Talwar et al., 2019: 79). Hence, I conclude that users' actions regarding fake news are shaped by particular norms of social media behavior and personal reasons to participate in online communication.

Trust in information is often considered as one of the major factors stimulating sharing behavior. For instance, this was demonstrated by M.A. Stefanone, A. Vollmer, and J.M. Covert (Stefanone et al., 2019) in an experiment with 207 participants. Scholars found that trust is indeed a strong predictor of the willingness to share information regardless of the political frame of the message or its truthfulness. Nevertheless, there is also research that does not confirm the dependency between trust in fake news and sharing behavior. A survey conducted among 63 college students showed, on the contrary, a negative correlation between the willingness to share fake news and the evaluation of trustworthiness (Leeder, 2019), although the sample of this study should be considered as a limitation.

Another study linked a survey with the participants' Facebook data, which gave an insight into the demographic characteristics and patterns of online behavior of the users sharing fake news (Guess et al., 2019). According to the article, 8.5 % of respondents who gave access to their social media profile shared at least one story from the fake news source during the 2016 election campaign, which authors describe as rather rare behavior. Furthermore, scholars concluded that the more content users shared, the less they were likely to spread stories from fake news domains (Guess et al., 2019: 2). This suggests that higher online activity can be associated with a better ability to distinguish between false and true news. Another finding of the study reveals that the most robust factor predicting fake news sharing is age: users over 65 posted nearly seven times as many articles from fake news domains as the youngest users. I believe that both of these outcomes show the role of media literacy in processing fake news.

Fake news sharing was also explored in experiments. For example, research revealed a positive correlation between an intention to share a false story and previous exposure to it (Effron, Raj, 2020). During four experiments and one pilot study participants (overall number – 2587) were shown fake news headlines (once or multiple times) and then were asked how likely they were

to engage in different forms of social media behavior. It is worth noting that in three of these experiments participants were explicitly told that headlines described false events and in another one, they learned about it only after fulfilling the task. Results showed that people found it less unethical to share the message that they had already seen even if they knew it was fake. Furthermore, those who had seen the headline multiple times were more likely to like it or share it than those who had seen it just once.

Among the factors influencing sharing behavior, scholars tested an effect of comments written by other users. As it was found in an experiment conducted by J. Colliander (Colliander, 2019), critical comments lowered attitudes towards the post with fake news and intentions to share it. Meanwhile, supportive comments led to higher attitudes towards the post, however an intention to share in this group was not significantly higher than in the control group which did not see any comments. This finding does not directly confirm the influence of supportive comments on sharing behavior, although it points to the general role played by other users in shaping opinions about the content.

At the same time, a survey of 2501 respondents from Singapore found that most of the participants (73 %) tend to ignore fake news and do not make comments on it (Tandoc et al., 2020). Apparently, such a tempered reaction is common for true news consumption as well. This claim can be supported by a study that is not directly related to fake news. According to O. Tenenboim and A.A. Cohen (Tenenboim, Cohen, 2015) the most clicked news items often do not intersect with the most commented ones. This means that a news article can reach a wider audience without necessarily having many comments. Hence, one can assume that in real life users would not always leave revelatory comments even to a popular fake news post.

4. Results

The reviewed articles provide several important, but sometimes controversial findings regarding the circulation of misinformation on the Internet.

Fake news can virally spread and attract a wide audience, although generally fake news websites have lower traffic rates and false stories reach fewer people on social media than true ones. Nonetheless, we should not underestimate fake news' detrimental potential based exclusively on the fact that it represents a relatively small part of overall media consumption. First of all, even a moderate number of fake news can result in "second-hand disinformation" when its audience influences the beliefs and opinions of other people (Tandoc, 2019: 4). Secondly, even a media phenomenon of a limited scale may lead to large consequences. For instance, research suggests that when making vaccination decisions parents are influenced by social media and parents' groups in particular (Brunson, 2013). As a result, the group's refusal to vaccinate can cause a disease outbreak, thus affecting significantly more people than those involved in parents' groups. In this sense, fake news can be harmful without reaching the majority of the audience. Furthermore, it should be noted that some of the studies compare fake news sites to the most popular mainstream news media such as *The New York Times*, *Fox News*, *The Washington Post*. These outlets have many more visitors not only than fake news sites but also than most of the niche or local media, which, however, does not prove that the latter does not influence the audience or particular community at all.

Fake news differs from real news in its patterns and dynamics of dissemination. For example, it can actively spread during a longer period of time (which is not common for the true stories) and come back to the agenda multiple times. Moreover, while real news is mostly diffused via verified accounts, including those of media organizations, fake news is often posted from unknown accounts. Besides, it can contain direct mentions of other users or hashtags which enable broader reach. This, in my opinion, indicates a sometimes calculated nature of fake news spread. As far as I can judge from these results, patterns of fake news circulation (such as its recurrence and targeted delivery to the users) resemble tactics employed by marketing or political propaganda that are aimed to affect people's beliefs or behavior. I argue that fake news represents a form of disguised propaganda on social media, which, as described by J. Farkas and S. Neumayer, is a "socio-technical phenomena arising at the intersection of social relations and digital architectures" (Farkas, Neumayer, 2020: 10).

One of the tools for misinformation propagation are bots. However, it is difficult to unequivocally assess their role in fake news dissemination based on the existing research. While some scholars claim that bots' activity influences the behavior of real users, others believe that it is

real users who primarily facilitate the circulation of fake news. I argue that bots are involved in fake news transmission to some extent. Nevertheless, this should not be considered a unique disinformation tool, since bots are also used by media organizations to accomplish various goals (see, for example, Lokot, Diakopoulos, 2016). In my opinion, this issue requires further investigation – in particular, the involvement of bots on different stages of fake news dissemination needs to be determined.

Nonetheless, existing research indicates that real users heavily contribute to fake news diffusion by sharing it on their social media accounts. The decision to share content is influenced by a variety of factors. Trust in information is an important factor that can directly or indirectly (for instance, through media literacy or political attitudes) influence the decision to share fake news. However, perception of accuracy is not the only aspect of sharing behavior, which also depends on personal traits, the risk-taking propensity of a user, and expected feedback from the audience.

Furthermore, according to the scholars, users can repost news not only when they believe it but also when they realize it is a lie. For example, people can share fake news if they were previously exposed to it or if they feel pressure to engage in social media activity. Media literacy seems to be another important factor affecting sharing behavior and age is one of the user characteristics it could be related to. Thus, fake news sharing (intentional or unintentional) appears to be a complex phenomenon affected not only by the believability of misinformation but also by patterns and forms of social media activity.

5. Conclusion

In this literature review, I summarized the outcomes of empirical studies that characterize the online dissemination of fake news. However, there are certain limitations in the observed literature, which could be addressed in further studies.

Firstly, existing research seems to be rather narrow in terms of themes and the context, since the majority of quantitative studies focus on the American (or English language) media agenda and many of the crucial papers specifically examine fake news spread during the 2016 US Presidential elections or other national political events. At the same time, fake news circulation obviously has its local peculiarities. For instance, differences occur even in topics that prevail in misinformation in various countries (Humprecht, 2019). Therefore, I find it necessary not only to explore how fake news disseminates in states with different media systems and political regimes but also to conduct comparative research which will provide a better understanding of the way misinformation exists in different contexts.

Secondly, as far as I can tell, the role of media in fake news dissemination remains unclear. On the one hand, media organizations can intentionally or accidentally post fake stories. Some of the studies mentioned in this paper divide information sources to reliable news media (often digital versions of legacy media such as large newspapers or TV-channels) and fake news websites (this group is often constructed based on the data from fact-checking sites like *PolitiFact*, *FactCheck* or *Snopes.com*). However, sometimes legitimately operating media are categorized as fake news websites as well – for example, one of the studies included large Russian outlets *Russia Today* and *Izvestiya* in this group (Kumar et al., 2020). This reflects the blurred line between journalists and news media on one side and fake news producers and misinformation websites on the other. Furthermore, fake news can influence the media agenda to a certain extent (Vargo et al., 2018). Some scholars stress that the number of people consuming fake news does not correspond to the number of people that are aware of this information, which circumstantially suggests that they learn about major fake stories from mainstream media (Tsfati et al., 2020).

Thirdly, unfortunately, none of the studies under review gives an overview of the whole misinformation ecosystem since most of them focus on one or two platforms (primarily *Facebook* or *Twitter* and fake news domains). Meanwhile, messengers or private chats are significant information channels as well. For instance, in Russia, they were used to share fake news about an earthquake in the Far East (Soshnikov, Boyko, 2016) or about coronavirus pandemic (Istomina et al., 2020). Although there is research investigating fake news circulation on *WhatsApp* (see, for example, Farooq, 2018) I am not aware of any large cross-platform study which would have considered fake news dissemination as a phenomenon transcending various communication channels.

Finally, regarding users' sharing behavior I propose more focused research into the perception of different news topics. For instance, scholars found a correlation between an intention

to share medical rumor and personal health anxiety (Oh, Lee, 2019). This suggests that user behavior is affected not only by general factors as news trust or media literacy but also by more specific motivations related to the content of a particular news story.

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