
QUANTITATIVE ANALYSIS REGARDING THE PROBABILITY OF SPREADING FAKE NEWS BASED ON AGE

Tanțău Adrian¹, Pop Mihai² and Chinie Alexandra Cătălina³
^{1) 2) 3)} Bucharest University of Economic Studies

E-mail: adrian.tantau@fabiz.ase.ro; E-mail: mihai.pop@digitix.ro;

E-mail: catalina.chinie@fabiz.ase.ro

Abstract

The emergence of social media has influenced the way people connect with each other, assimilate and share information and interact with businesses or institutions. Certainly, these new means of communication have brought many benefits, both for companies, as well as individuals, especially in a world in which time has become the most valuable resource.

Unfortunately, recent studies and international debates have pointed out that social media can be a main factor in creating economic and social imbalance. One of the main factors associated with the negative impact of social platforms refers to fake news. Its ability to influence the perception of public figures, companies and state institutions and interfere in important economic, democratic or legislative processes has caught the attention of researchers and international organisms.

This article aims to analyze the routs, factors and demographic criteria which play a part in the dissemination of fake news. The conducted quantitative study has had the objective of analyzing the reaction of individuals when confronted with both information presented in a fake news specific manner, as well as in an objective one. Moreover, it aimed to establish if age can influence the assimilation and spreading degree of fake news.

Keywords:

Fake news, social media, social platforms, digital communication, misinformation.

JEL Classification:

M10, M31

Introduction

In recent years social media has gained popularity across the globe due to the benefits and opportunities it offers. Both individuals as well as companies have progressively embraced these new means of communication and information. A study conducted at EU level points out that 47% of all European companies have used at least one important social media platform in 2017 (Eurostat, 2017). While, individuals use social media platforms to connect with others worldwide and to create, share, comment and gain information based on personal interests, companies use these platforms in order to raise brand awareness, improve marketing, increase sales, develop public relations, involve consumers in product and services development, receive feedback and recruit personnel.

Unfortunately, social media is not only associated with benefits like the ones mentioned above, but also with risks which concern privacy, online harassment, bots, trolls,

misinformation, disinformation, fake reviews and fake news. Moreover, recent important social and political events (2016 US presidential elections, Brexit, national and international protests) have increased the number of critics directed towards these new means of communication. Specialists point out that there is a link between the development of social media and the extreme polarization of topics and debates (Antoci et al., 2019). The above-mentioned situation is especially associated with the phenomenon of fake news which has intensely been debated for the last couple of years and represents one of the main concerns associated with social media. Allcott and Gentzkow (2017) underline that fake news is deliberately created and disseminated with the objective of generating outrage and misinformation in order to gain political or financial benefits. Often fake news is published on anonymous websites which have similar domain names as renowned ones. Moreover, the huge amount of data, together with the diversity of the generated and spread information, makes it impossible in most of the cases to fact check, evaluate and combat fake news.

As recent events have demonstrated, fake news can negatively impact the perception of public figures, companies and state institutions and manipulate the public opinion to take a given action. Obviously, this phenomenon has great implications on the social, economic and political situation of a country, region or international organism. In order to better understand the roots of fake news and its impact, we have conducted a quantitative study analyzing the relation between the spreading degree of fake news and age.

Literature review

The new means of communication

For the last decade, the interest associated with the assessment and analysis of social media has exponentially increased. The popularity of this phenomenon has expanded the development of content and the generation of big data available online. The new means of communication, together with the online integrated search engines, promote the generation of big data as never before in the history of mankind. In this perspective, researchers and companies have developed models and algorithms based on artificial intelligence and machine learning (Pelau & Ene, 2018). Furthermore, instruments and technics which allow the storage, administration, analysis and access of data are constantly being developed (Jimenez-Marquez et al., 2019).

In this context, social media has become an important source of information and an optimum environment for spreading ideas, news and personalized content all around the globe (Kang, Lee, 2017). Moreover, authors point out that important social media platforms support users in interacting with each other inside communities, in sharing ideas and opinions and even in participating in organised events based on their location and interests (Kang, Lee, 2017). In general, social media refers to Internet based applications which include social platforms, multimedia sharing websites and blogs.

Chung (2017) points out, that with the technological development, news sources have become more complex while internet users have been offered the possibility of becoming active communicators and creators of content, rather than passive receivers of information. Moreover, in the online environment, both news platforms as well as the public have the role of acting as information sources for internet users (Chung, 2017). For this reason, the information quality of the published news has become an important issue in the academic environment, as well as for companies and public institutions. Sundar et al. (2017) emphasize that the main concern of readers is to establish if the encountered news is trustworthy, precise, objective and readable. Furthermore, the authors point out that information perceived as having a low quality is not considered by readers in the process of taking decisions. Moreover, the perceived quality of news is essential for the readers' acceptance or rejection of the presented information or message. The development of social

media and its popularity has also influenced the criteria on which readers analyse the quality of news.

When evaluating the credibility of news or articles published on online platforms, Lee-Won et al. (2016) suggest that social media interactions (likes, comments and shares) play a significant role. Users translate these social media metrics, which in most cases are presented alongside the article or news, as popularity or virality indicators of the published content. Authors point out, that some media organisations take editorial decisions and evaluate the performance of their journalist based on the generated social media specific interactions (Cherubini, Nielsen, 2016). These metrics not only influence the website traffic but offer precious feedback regarding the generated impact of the published articles or news (Chung, 2017). The public appreciation or sharing represents a certain degree of support for the presented information (Stavrositu, Kim, 2014).

Knobloch-Westerwick et al. (2005) suggest that internet users tend to select and read news articles if these have explicitly been recommended by others. In this regard, a higher number of reads determines a longer exposure of the recommended article. A study conducted by Chung (2017) points out that internet users tend to associate online available news articles, which have generated a high number of social media specific metrics, with a higher quality and credibility in comparison to articles which lack social media interactions. This observation implies that for some readers social media metrics represent an important indicator which shows the acceptance and approval of other users and therefore the associated news article can be interpreted as a trustworthy information source. Furthermore, the author emphasizes that in a situation in which social media metrics are not available, the indicator of quality associated with a news article is represented by the credibility and reputation of the media source. In this perspective, Chung (2017) suggests that social media metrics are more important for a media organization which lacks a good reputation and credibility.

The above-mentioned observations signal an important issue associated with the new means of communication. Even though the primary objective of social platforms is to connect people all around the world and offer them the possibility of sharing information and co-creating content, one can observe that the developed social platforms facilitate an online environment in which quality, morality and ethics play a secondary role. Even so, a study conducted by (Mander, 2017) emphasizes that there is an increasing trend regarding the use of social platforms which is reflected through the average two hours spent daily by users on social media platforms and on messaging applications in 2017.

Mostly, the academic field has focused on the positive aspects associated with social media and social platforms. The major part of the available research has the objective of establishing business, image and economic opportunities related to these means of communication. Nevertheless, in the last couple of years it has become clear that social media can also be associated with negative aspects and risks which can jeopardize the lives and perception concerning individuals, communities, companies and society (Baccarella et al., 2018).

The fake news phenomenon

Individuals use social media platforms in order to connect with others without being limited by geographic boundaries, but at the same time they disconnect from the individuals who stand in front of them. This type of social behavior has long-term effects on the way individuals develop their thinking and acting patterns, facilitating the appearance of superficial behavior which lacks moral and ethical principles. Moreover, negative aspects related to social media include addiction, online harassment, trolling, privacy violation, paid reviews and of course fake news, a new concept, which in recent years has captured the attention of specialist worldwide.

Lazer et al. (2018) define fake news as false information distributed and spread with the purpose of deceiving individuals. Moreover, this phenomenon includes news articles which deliberately contain false information, fact that can be proven, in order to mislead readers (Allcott, Gentzkow, 2017).

Unfortunately, through their infrastructure, social media platforms facilitate the spreading of this phenomenon. The huge amount of news available online makes it impossible to analyze the veracity of the published information and of the primary news source. This was not the case with traditional media where the source was always traceable.

Authors point out that in general fake news are „pseudo news” which are presented as being factually correct but lack real facts. Moreover, this type of news is either the result of a deliberate disinformation campaign or represents the outcome of a mistake which can be considered misinformation (Hannah et al., 2015). Recent debates emphasize that fake news include sensationalism, due to which millions of readers worldwide are attracted and engaged (Baccarella et al., 2018). This observation is supported by Chang et al. (2016) who point out that the top 20 fake news, which were published throughout the 2016 US presidential campaign, have generated a higher number of interactions on social media in comparison to the top 20 news articles generated by renowned media publications.

As Kietzmann et al. (2011) note, important social media platforms possess the necessary instruments in order to motivate online users to post and share personalized content and to join groups and communities based on interests and location. As individuals share, interact and spread content, the risk of disseminating misinformation, content without copyright and fake news arises. Allcott and Gentzkow (2017) point out that during the 2016 US presidential election more than 100 websites, which have been created with the objective of spreading fake news, have been managed by adolescents from Veles, Macedonia.

In conclusion, the spreading of news on social media platforms is associated with high risks related to misinformation and disinformation, because the verification of the information’s source and author is time-consuming and, in some cases, impossible.

Factors determining the spread of fake news

When analyzing the impact of fake news and its spreading patterns, some authors have pointed out the responsibility of social media users. Alkhodair et al. (2019) note that a major part of online active individuals has the tendency of spreading breaking news or trending topics without verifying the veracity of the information. In this context, one should understand that every single individual, who is active in the online environment and interacts with others, can influence the spreading degree of false information. Colliander (2019) conducted a study which proves that a negative feedback related to fake news and exposed by online users through comments, can determine a negative reaction of other readers, who encounter these comments, and therefore can contribute to the combat of the disinformation. On the other hand, if fake news is supported through positive comments, the spreading degree of the false information increases, determining a higher impact among internet users. Moreover, a recent study made public by Pew Research Center (2016) noted that more than 23% of Americans have voluntarily or involuntarily contributed to the spreading of fake news. Tantau et. al. (2018) pointed out that gender and age play a significant role in the dissemination of fake news, while Pop and Ene (2019) emphasized the importance of the educational level on the spreading degree of false information.

Although economic, political or ideological interests are key factors and motivators which determine the publishing and spreading of fake news, the above-mentioned findings demonstrate the importance and the responsibility of internet users in mitigating this phenomenon.

Research methodology

The aim of the paper is to analyze the spread of fake news among the younger generations and the older generations, and if age is a determinant for their acceptance among the two demographic categories. In order to assess the impact that fake news have on people from the two age groups, a survey was performed on 504 people, out of which, 322 were younger than 40 years and 182 were older. The interviewees were given two sets of posts made on Facebook. The first set consisted in two posts containing text as well as photos, while the second set only contained text. One of the posts was written in a subjective, provocative manner, while the other was more focused on facts and was written in a more objective manner (Table no. 1). In the first set, the photo included in the subjective post contained a violent image from a Romanian street protest, while the second one contained only a photo of the Romanian Government's building.

Table no. 1. Survey questions

Survey question number	Objective post	Subjective post
Question 110	Tens of thousands of Romanians have peacefully protested in front of the Government. They have manifested their discontent with the way in which the current coalition governs. What they asked for and how the Government representatives answered.	Revolting images that captured the moments when the peaceful protesters were aggressed and beaten without mercy by the riot police! Read the terrible confessions made by protesters caught in the inferno created by authorities.
Question 111	Romania has registered a 48% increase of the price of natural gas in the last year. According to declarations made by the representatives of the Romanian Industries and Services Committee of the Chamber of Deputies, the increase has been caused by the liberalization process.	HISTORICAL increase caused by the incompetence of the political class! The price of natural gas has tripled! How will the invoices from the following years change and how many Romanians will freeze in their homes due to the lack of money? Click on the link for further information.

For each post, interviewees had to answer two questions (110a, 110b, 111a, 111b). First, they had to grade on a 7-points Likert scale, the probability that they would share the post. Secondly, they had to evaluate the probability to choose one option against the other, if they had to share one of them. The percentages for the probabilities to share the two posts had to sum up to 100%. Responses related to the two sets of posts were evaluated in SPSS using the discriminant analysis.

Results and discussion

Results of the analysis show a higher probability for the objective post to be shared (Table no. 2 and Table no. 3). The rating on the Likert scale was 3.785 for the first objective post, while the rating for the second objective post was 4.039, as opposed to 3.480 for the first subjective post and 3.357 for the second subjective post.

The difference between the means of the Likert scale ratings are statistically insignificant for both age groups (younger/older than forty) for the first set of posts (question 110a), and for people older than forty for the second set of posts (question 111a). The higher

probability that people from both age groups share the objective post, as opposed to the subjective post, is based on question 110b (p value <0.05, F stat 29.29, 29.67 respectively) and question 111b (p value <0.05, F stat 62.14, 8.615 respectively).

The analysis of the percentages' means, measuring the probability to share one of the two posts, shows that there is a higher probability for people under forty to share the subjective content that also included a photo, as opposed to people over forty (average 41.99% chance for the subjective post to be shared by people under forty and 38.68% chance for the subjective post to be shared by people over forty). This result may also be due to the content of the post, which describes protests where many young people participated. In the case of the second post, which only included text, there was a higher probability for older people to share the subjective content - 43.69% probability, as opposed to 37.15%, probability for the post to be shared by someone under forty. This result is in line with results of research performed by Guess et al. (2019), who found that people over 65 were the most predominant disseminators for fake news, and that conducted by Tantau et al. (2018), where a higher engagement rate of older people to Facebook posts that are written in a subjective, clickbait specific manner was identified.

Table no. 2. Discriminant analysis results for the influence of suggestive pictures on the spread of fake news (question 110)

Variable	Mean in objective post	Mean in subjective post	Standard deviation objective post	Standard deviation subjective post	F value (df:1,502)	P
Q110a	3.785	3.480	2.07	2.203	2.566	0.110
Q110b	59.16	40.79	27.00	27.03	58.21	0.000
Q110a – Age<40	3.69	3.521	2.03	2.153	0.555	0.457
Q110b – Age<40	57.94	41.99	26.40	26.47	29.29	0.000
Q110a – Age>40	3.94	3.406	2.15	2.29	2.660	0.105
Q110b – Age>40	61.31	38.68	2.25	2.21	29.667	0.000

Note: Significance: *** for $p < 0.01$; ** for $p < 0.05$; * for $p < 0.10$

Source: Own research results

Table no. 3. Discriminant analysis results for the influence of suggestive words on the spread of fake news (question 111)

Variable	Mean in objective post	Mean in subjective post	Standard deviation objective post	Standard deviation subjective post	F value (df:1,502)	P
Q111a	4.039	3.357	2.098	2.211	12.628	0.000
Q111b	60.66	39.51	29.52	29.78	64.055	0.000
Q111a – Age<40	4.07	3.20	2.10	2.179	13.27	0.000
Q111b – Age<40	62.84	37.15	29.23	29.23	62.14	0.000
Q111a – Age>40	3.97	3.62	2.10	2.25	1.184	0.278
Q111b – Age>40	56.80	43.69	29.80	30.45	8.615	0.004

Note: Significance: *** for $p < 0.01$; ** for $p < 0.05$; * for $p < 0.10$

Source: Own research results

The difference of the overall means for the Likert scale ratings and the allocation of the probability percentages for the two sets of posts show only a very slight increase in the

spread of the fake news post which included a photo (3.480 mean for 110a and 3.357 mean for 111a; 40.79 mean for 110b and 39.51 mean for 111b).

Conclusions

As internet users have become active communicators and creators of content, fake news has started to spread. While awareness regarding this phenomenon has raised, a growing number of researches was conducted in order to assess the state of the fake news dissemination (Guess et al., 2019; Pew Research Center, 2016), as well as to identify what influences its acceptance and distribution (Colliander et al., 2019; Pop and Ene, 2019).

The goal of the paper was to complete a prior research regarding the fake news phenomenon, conducted by Tantau et al. (2018), delivering a current status of the spread of fake news on social media platforms and the influence that age has on the acceptance of fake news.

The research assessed the preference of the population for social media posts written both in a subjective, provocative manner and in an objective manner. Results of the study have shown that when given two options of content, one written in a subjective and provocative manner, and one written in an objective manner, more facts oriented, there is a higher probability that people choose to share the objective one. Results regarding the propagation of fake news depending on age were different for the two cases included in the study: while people under 40 years would share fake news accompanied by a photo more than people over 40 years would do, the latter category would share the fake news consisting only of text. However, the content of the posts could have been one of the reasons for this difference in results, as the first case was referring to protests where many young people participated.

The reason for the outcome of the study could be that internet users using social media have become more educated regarding the fake news phenomena and can identify content which may represent misinformation or click-bait, when given the two options of an objective piece of news and a subjective, provocative one, referring to the same matter, side by side. However, as the Tantau et al. (2018) research has underlined, when navigating on social media, users do not question the trustworthiness of the information as much. Further research could offer more insight into the matter by interviewing social media users regarding their behavior towards news distributed on these platforms.

References

- Allcott, H. and Gentzkow, M., 2017. Social media and fake news in the 2016 election. *The Journal of Economic Perspectives*, 31(2), pp.211-236.
- Antoci, A., Bonelli, L., Paglieri, F., Reggiani, T. and Sabatini, F., 2019. Civility and trust in social media. *Journal of Economic Behavior and Organization*, 160, pp.83–99.
- Baccarella, C.V., Wagner, T.F., Kietzmann, J.H. and McCarthy, I.P., 2018. Social media? It's serious! Understanding the dark side of social media. *European Management Journal*, 36(4), pp.431-438.
- Chang, J., Lefferman, J. and Pedersen, C., 2016. *When fake news stories make real news headlines*. [online] Available at: <<https://abcnews.go.com/Technology/fakenews-stories-make-real-news-headlines/story?id=43845383>> [Accessed 10 April 2019].
- Cherubini, F. and Nielsen, R., 2016. *Editorial analytics: How news media are developing and using audience data and metrics*. *Digital News Project 2016*. [online] Reuters Institute for the Studies of Journalism. Available at: <<https://reutersinstitute.politics.ox.ac.uk/sites/default/files/Editorial%20analytics%20-%20how%20news%20media%20are%20developing%20and%20using%20audience%20data%20and%20metrics.pdf>> [Accessed 10 April 2019].

- Chung, M., 2017. Not just numbers: The role of social media metrics in online news evaluations. *Computers in Human Behavior*, 75, pp.949-957.
- Colliander, J., 2019. "This is fake news": Investigating the role of conformity to other users' views when commenting on and spreading disinformation in social media. *Computers in Human Behavior*, 97, pp.202–215.
- Eurostat, 2017. *Social media - statistics on the use by enterprise*. [online] Available at: <https://ec.europa.eu/eurostat/statistics-explained/index.php/Social_media_-_statistics_on_the_use_by_enterprises#Use_of_social_media:_highlights> [Accessed 10 April 2019].
- Guess, A., Nagler, J. and Tucker, J., 2019. Less than you think: Prevalence and predictors of fake news dissemination on Facebook. *Science Advances*, 5(1), pp.1-8.
- Hannah, D. R., McCarthy, I. P. and Kietzmann, J., 2015. We're leaking, and everything's fine: How and why companies deliberately leak secrets. *Business Horizons*, 58(6), pp.659-667.
- Jimenez-Marquez, J.L., Gonzalez-Carrasco, I., Lopez-Cuadrado, J.L. and Ruiz-Mezcua, B., 2019. Towards a big data framework for analyzing social media content. *International Journal of Information Management*, 44, pp.1–12.
- Kang, J. and Lee, H., 2017. Modeling user interest in social media using news media and Wikipedia. *Information Systems*, 65, pp.52–64.
- Kietzmann, J. H., Hermkens, K., McCarthy, I. P. and Silvestre, B. S., 2011. Social media? Get serious! Understanding the functional building blocks of social media. *Business Horizons*, 54(3), pp.241-251.
- Knobloch-Westerwick, S., Sharma, N., Hansen, D. L. and Alter, S., 2005. Impact of popularity indications on readers' selective exposure to online news. *Journal of Broadcasting & Electronic Media*, 49(3), pp.296-313.
- Lee-Won, R.J., Abo, M.M., Na, K. and White, T.N., 2016. More than numbers: Effects of Social media virality metrics on intention to help unknown others in the context of Bone Marrow donation. *Cyberpsychology, Behavior, and Social Networking*, 19(6), pp.404-411.
- Mander, J., 2017. *Daily time spent on social networks rises to over 2 hours*. [online] Available at: <<https://blog.globalwebindex.com/chart-of-the-day/daily-time-spent-on-social-networks>> [Accessed 10 April 2019].
- Pelau, C. and Ene, I., 2018. Consumers' perception on human-like artificial intelligence devices. In: Pamfilie, R., Dinu, V., Tăchiciu, L., Pleșea, D. and Vasiliu, C., *BASIQ International Conference: New Trends in Sustainable Business and Consumption – 2018*. Heidelberg, Germany, 31 May - 3 June 2018. Bucharest: ASE Publishing.
- Pew Research Center, 2016. *Many Americans believe fake news is sowing confusion*. [online] Available at: <<http://www.journalism.org/2016/12/15/many-americans-believefake-news-is-sowing-confusion/>> [Accessed 10 April 2019].
- Stavrositu, C.D. and Kim, J., 2014. Social media metrics: Third-person perceptions of health information. *Computers in Human Behavior*, 35, pp.61-67.
- Tanțău, A., Pelau, C. and Pop, M., 2018. Fake news in the energy industry. In: Pamfilie, R., Dinu, V., Tăchiciu, L., Pleșea, D. and Vasiliu, C., *BASIQ International Conference: New Trends in Sustainable Business and Consumption – 2018*. Heidelberg, Germany, 31 May - 3 June 2018. Bucharest: ASE Publishing.