UNIVERSITEIT ANTWERPEN
Academiejaar 2019-2020

Faculteit Bedrijfswetenschappen en Economie

A theoretical analysis of the impact of influencers on the quality of news on social media

Yannick Jansen

Masterproef voorgedragen tot het bekomen van de graad van:
Master in de TEW: Handelsingenieur

Promotor: prof. dr. Luca Paolo Merlino

Universiteit Antwerpen

Abstract

There are many different actors who are known to have a considerable impact on the diffusion of (fake) news on social media. However, the impact of influencers on (fake) news, has not been sufficiently investigated. This thesis deals with the introduction of influencers to social media, and their effect on the quality of news on social media. It shows that there are two different possible cases. In the first case, influencers inspect messages more often. Despite the fact that regular individuals respond to this by sharing messages more often without inspecting, less fake news are shared overall. In the second case, influencers inspect messages less often and share messages more often without inspecting. Despite the fact that regular individuals respond to this by less often sharing messages without inspecting, more fake news are shared overall. The thesis proves that whether influencers cause more or less fake news to be shared, depends on a combination of five influencer and social network specific characteristics. These characteristics are (i) the influencer's utility from sharing a true message, (ii) the influencer's inspection costs, (iii) the proportion of fake messages on the social network, (iv) the persuasiveness of the message and (v) the influencer's prior beliefs about the true state of the world. This way, the thesis shows that influencers are actors on the social network that should not be forgotten about in the war on fake news.

Preface

In the final year of my Master in Applied Economic Sciences: Business Engineering at the University of Antwerp, the master's thesis is a crucial aspect in order to obtain the degree. In the knowledge that this would be a thorough work, I chose to write my master's thesis on a topic that interests me deeply: fake news.

Writing this thesis enabled me in gaining insight in the ways that fake news are diffused on social media. Furthermore, the process of analysing the (fake) news network taught me analytical skills I did not yet possess. Trying to link the results of the thesis to potential policy implications was a challenge, which I did not initially expect to be as difficult. This made me realize that there is often a big gap between theory and practice. It demands experience and perseverance to overcome this gap.

First and foremost, I would like to thank my promotor prof. dr. Luca Paolo Merlino for his extensive and useful guidance. He was a true mentor in every aspect of the process, without who this research would not have been possible. Secondly, I would like to thank the University of Antwerp for giving me the opportunity to perform my own research on an interesting topic, and for giving me the tools to do so. Finally, I would like to thank my friends and family, who managed to keep me motivated, especially in times where it was hard to find inspiration.

Yannick Jansen Lier, Belgium June 5th, 2020

Contents

List of Tables

Part I

Thesis

1 Introduction

Fake news are not so much a recent phenomenon, examples of the diffusion of fake news even go back to the Roman empire (Pollok, 2017). As an illustration, a more recent case of the diffusion of fake news, namely the infamous 'Great Moon Hoax' of 1835, is explained. In this hoax, the New York Sun published several articles concerning findings of the widely respected astronomer Sir John Herschel about his discovery of giant man-bats and goat-like creatures living on the moon (Thornton, 2000). The New York Sun subsequently saw a boost in their sales going from 8000 copies a day to 19000 (Bjork, 2001). Five years later, Richard Adams Locke admitted to writing the articles and falsely quoting John Herschel, with the intention of creating an extravagant story and a surge in sales, in which he succeeded. Even though a scenario like this seems highly unlikely in the 21st century, there are plenty of examples that have the same characteristics as the 19th century example. There is, for example, the diffusion of the news that Pope Francis endorsed Donald Trump as president (Papanastasiou, 2020). This news was later found to be fake, however its impact on the public opinion might have affected the outcome of the 2016 US presidential election drastically (Allcott & Gentzkow, 2017).

The main difference with the example from the 19th century is that nowadays, news does not only spread through word of mouth and newspapers, but, among others, through social media. On social media, (fake) news spreads in a much more targeted and fast way. Additionally, the news is often not fact-checked by some sort of third-party. Another aspect that changed the media landscape is that now, with social media, also non-journalists can

write articles. This so called 'citizen journalism' (Tandoc, Lim, & Ling, 2017) is more difficult to control since there is no controlling party (like a news agency) and the author of the article is harder to trace. As social media is the main information source of many people nowadays, these people are very easily misinformed (Kyung-Sun, EunYoung, & Sei-Ching, 2011).

On social media, some users are more influential than others. There are, for example, influencers who are connected to millions of users. The power of these influencers is growing by the minute. The bulk of their revenues are received through advertisement, usually for big brands. These big brands can reach a wide audience this way, because influencers have a wide fan-base. As these influencers have such a wide fanbase, their roles in the diffusion of (fake) news on social media could also be of crucial importance, considering their ability to reach millions of readers simultaneously. Since the effect of influencers on, among others, fashion purchasing behavior has been proven (Casaló, Flavián, & Ibáñez-Sánchez, 2018), it is more than likely that there is also an effect of influencers on the news consumption of their followers. As Newman (2011) stated, it is important to build strategic relationships with influencers and bloggers so that their influence can be used to combat fake news. However, the impact of these influencers on the quality of news on social media, has not been sufficiently investigated. As such, there is still a gap in the literature in this regard.

Much research has already been carried out on the political and social importance and threats that fake news impose on the current institutions. However, less attention has been given to the economic causes and consequences of fake news so that there is still a gap in the research about the economics of fake news. For this reason, this master thesis solely focuses on the economic perspective of fake news, more specifically, it gives an economic analysis of the diffusion of fake news on social media.

Since the consequences of fake news have already been thoroughly investigated, its impact is widely known. History has already proven that the result of fake news and an ill-informed

public can be disastrous. Ample examples can be given on how fake news has influenced the 2016 election of the US president Donald Trump. Since these examples are more widely known and only have a political impact, an example with a social impact is discussed. In India, a series of lynchings happened in 2017, most of these lynchings were organized mob-related violence. These mobs usually consist of poorly educated people inspired by fake news (mainly spread on WhatsApp) about child abductions, organ harvesting etc. The death toll of these lynchings reaches over 40 people (Arun, 2019). This is an example of how there are also severe social consequences caused by fake news. The relevance of this thesis lays in analyzing new factors contributing to the diffusion of fake news and, this way, also opening up new potential ways of combating fake news.

As a guide within this economic analysis, the following research questions will have to be answered:

1. What is the impact of influencers on the quality of news on social media?
2. Can this impact be made (more) positive by manipulating the characteristics of a social network?

To begin with, chapter 2 briefly introduces the existing models that represent the diffusion of (fake) news on social media. It deals with different models by looking for common aspects and differences within the existing literature. Next, in chapter 3, a baseline model is generated by integrating different aspects from the literature review. Subsequently, influencers are introduced on the model and their impact on the quality of news on social media is investigated. Then, chapter 4 discusses the results, links these results to potential policies and, afterwards, concludes the thesis. Finally, the appendix deals with the proofs on which the results are based.

2 Literature review

In this literature review, the main contributions of different models are mentioned. Moreover, the gaps in the literature are identified, filling these gaps is the intention behind the thesis. First, to decide whether certain types of messages are evaluated as fake news in the thesis, the definition of Gelfert (2018, pp.85-86) is used, stating that the term 'fake news' should exclusively be used when messages are "a deliberate representation of false or misleading claims, where these are misleading by design".

Within the existing literature, there are different models analyzing the diffusion of a message through a (social) network. The message being diffused through the network can either hold true or false information. Most models start with a certain true state of the world. This means that there is an aspect of the world on which information is available. This true state of the world is represented by θ, which illustrates, for example, whether the democratic or republican presidential candidate will perform better as president (Allcott & Gentzkow, 2017). The true state of the world is unobserved and unknown. All models deal with this in the same way, namely by assigning one out of two possible values to θ, 1/0 (Merlino & Tabasso, 2019) or one out of two possible letters, T/C (Papanastasiou, 2020). When receiving the message, the individual forms certain beliefs over the validity of the message. However, the individual only gets to know the true validity of the message when she chooses to inspect the message. This inspection usually comes at a cost. Next, the main contributions of different models are mentioned.

First of all, Allcott and Gentzkow (2017) incorporate into their model the fact that individuals do not only receive utility through the consumption of true news, but also when consuming news that it aligned with their prior beliefs, regardless of its validity. Next, Papanastasiou (2020) includes in his model the integration of individual and platform behavior. Furthermore, Papanastasiou (2020) brings back the infinite-period platform problem

to a finite-period platform problem by assuming a sharing cascade is triggered in period T_C. This means that, if the message reaches period T_C without having its validity disclosed, the message is automatically shared by every individual in every period $t > T_c$. It is an interesting idea trying to simplify the analysis by bringing back an infinite-period problem to a finite one. Bloch et al. (2018) model two different social platforms. First, in their 'public broadcast model', individuals have the ability to share a message with all other individuals in the network. Secondly, they describe a 'network communication model' in which messages are shared through one-by-one connections between two individuals. Next, Aymanns et al. (2017) include a feedback stage in their model. As a consequence of this feedback, individuals maximize their total discounted utility over all periods, enabling strategic behavior. Merlino and Tabasso (2019) point to two determining factors in the survival of fake news. These two factors are homophily (i.e., the likelihood that individuals interact with individuals of the same prior beliefs) and cost of verification (inspection). Finally, Bloch, Demange, and Kranton (2018) divide the individuals in the network into two different types. There are unbiased and biased individuals in the network. Unbiased individuals prefer the diffusion of news that match the true state of the world, while biased individuals prefer the diffusion of news more closely related to their own preferences.

Furthermore, three common phases are found within the existing models. These phases are (i) the individual receiving a message, (ii) potential inspection and the choice to share the message and (iii) potential feedback over the true state of the world and potential pay-offs. Important to note is that not every model deals with each and every phase in the same way. However, because these three phases can be found in most models, the model derived in this thesis is strongly based on these phases.

Note there are models that deal with two types of individuals. However, neither of these types are ever considered to be influencers. This thesis fills these gaps in the literature. The thesis, just like many of the existing models, deals with two different types of individ-

uals. However, it is the first time that one of these types represents influencers. This way, the thesis uses a combination of a network communication model (regular individuals potentially share the message with one individual) and a public broadcast model (influencers potentially share the message with more than one individual) as explained by Bloch et al. (2018).

3 Methodology & analysis

The goal of this chapter is to develop a 4-period model inspired by the model in Papanastasiou (2020). However, the model derived in this thesis is different in several aspects; certain building blocks are removed and some mechanisms are transformed. Subsequently, after generating the 4-period model, research is conducted with regards to what would change if a second type of individuals enters the network. This second type of individuals are known to be 'influencers', i.e. individuals who can share the message with more than one individual.

3.1 A 4-period model

The four periods considered in the 4-period model are the following. In period 0, the individual receives the message. Next, in period 1, this individual chooses her inspection and sharing actions. Subsequently, in period 2, the second individual receives the message (if and only if the first individual chose to share the message) and is faced with the same choice as the first individual. Finally, in period 3, the third individual receives the message (if and only if the second individual chose to share the message). However, the behavior of this individual in the third period is not analyzed, since she does not have the ability to share the message, meaning that the diffusion of the message stops here. In this

third period, the individual who receives the message has potentially already received the message in a previous period. However, we do not take this possibility into account and assume that every time an individual receives a message, it is the first time she receives the message. Finally, note that these four periods are linked to the three phases represented in the literature review.

The main focus is put on the probabilities of an individual taking a specific action after receiving a message (not sharing without inspecting, sharing without inspecting or inspecting and thereupon taking the right sharing action). These probabilities are analyzed and compared. We call these probabilities N_t, S_t and C_t respectively.

3.1.1 Individual's decision making process

We now begin to describe the new model, starting at the regular individual level. The model analyzes the diffusion of a message in the four periods previously described. Note that in this section, there is only one type of individuals; regular individuals.

The two possible states of the world $\theta \epsilon \{T, C\}$ are similarly modeled in the 4-period model as in the the existing literature. The message being spread can contain two possible contents; $m \epsilon \{"T", "C"\}$, meaning that it supports one out of the two potential true states of the world. Note that the thesis assumes that the message being diffused contains the content "T", in order to make further analysis more straightforward. The validity of the message, $v \epsilon \{t, f\}$, signifies whether the message represents the true state of the world (t) or does not represent the true state of the world (f). All individuals have an ex post opinion over the true state of the world, $b_{it} \varepsilon (0, 1)$, after receiving a message in period t, which can be interpreted as the individual's bias. The prior beliefs over the true state of the world are represented as $b_{i0} = P(\theta = T)$. This b_{i0} is an independent and identically distributed draw from a distribution having a cumulative distribution function H(.) with

H(.) continuous and strictly increasing for all positive numbers. An extra restriction on this H(.) is that H(0)=0 and H(1)=1. Furthermore, the parameter $a \in (0,1)$ denotes the persuasiveness of the message, which is calculated as the probability of the message containing true news, regardless of the content of the message. This can be illustrated as the credibility of the message. On the one hand, messages coming from credible sources, for example universities or high quality news papers have a high persuasiveness. On the other hand, messages coming from questionable sources, for example newspapers knows to have a certain political bias, have a rather low persuasiveness. Lastly, the posterior belief of the individual in period t that a message is fake, is represented by q_{it}. Proof 1 in the appendix shows that q_{it} is calculated in the following way

$$q_{it} = \frac{0.5 q_0 w_t}{0.5 q_0 w_t + [a b_{i0} + (1-a)(1-b_{i0})](1-q_0)},$$

with q_0 being the ex ante probability that the message is fake, which is common knowledge. This q_0 represents, for example, the proportion of fake news on the social platform. Furthermore, w_t is calculated as $w_t = \frac{S_t}{S_t + C_t}$ with $w_1 = 1$.

The action set describes the possible actions an individual is able to take after receiving a message. This action set is represented as $\alpha_{it} \in \{n, s, c\}$. Action n denotes the case where the individual does not share the message without inspecting. Action s represents the action of sharing the message without inspecting. Finally, action c shows that the individual first chooses to inspect the message at cost K > 0.5, and then subsequently chooses to share the message if it is found to be true, and not share if the opposite is the case. The probabilities that these actions are chosen by the individual, are represented by N_t, S_t and C_t respectively.

An individual gains a utility of 1 when sharing a true message or not sharing a fake message, and 0 utility when sharing a fake message or not sharing a true message. Using this utility function, the expected utility an individual receives from choosing a certain

action, is represented by

$$u_{it}(\alpha_{it}) = \begin{cases} q_{it} & \alpha_{it} = n, \\ 1 - q_{it} & \alpha_{it} = s, \\ 1 - K & \alpha_{it} = c. \end{cases}$$

The discussion starts in period 1. In this period, after receiving the message in period 0, the individual is faced with her first choice; whether to inspect the message or not, with inspection having a perfect outcome. If she does not inspect the message, she subsequently has to choose whether or not to share the message, based on her uncertain belief over the message's validity v. The action she chooses out of the action set $\alpha_{it} \epsilon \{n, s, c\}$ is the one that maximizes her expected utility, which is determined by the individuals's belief over the validity of the message, given that she receives the message in period t. The period-t individual's actions can be specified as a function of her prior opinion b_{i0}.

Proposition 1: In any period $t \epsilon \{1, 2\}$, there exist thresholds $z_t^l \leq z_t^h$, where z_t^l, $z_t^h \epsilon (0, 1)$, such that the period-t individual's behavior is described as follows:

(i) If $b_{i0} \leq z_t^l$, then α_{it} = n, meaning that the individual does not inspect and does not share the message.

(ii) If $z_t^l < b_{i0} \leq z_t^h$, then α_{it} = c, meaning that the individual inspects the message, and then chooses the appropriate sharing action.

(iii) If $b_{i0} > z_t^h$, then α_{it} = s, meaning that the individual shares the message without inspecting.

Intuitively, proposition 1 states that there are three intervals for b_{i0}. The individual chooses her action depending on what interval b_{i0} adheres to. If $b_{i0} \epsilon [0, z_t^l]$, the individual does not share the message without inspecting, since she believes rather strongly that the message is false. When $b_{i0} \epsilon]z_t^l, z_t^h]$, the individual inspects the message and then chooses the

appropriate sharing action, since she has no strong belief whether the message is true or false. Lastly, when $b_{i0} \epsilon\,]z_t^h, 1]$, the individual shares the message without inspecting , since she strongly believes that the message is true.

Finally, the probabilities of an individual taking a certain action (n, s or c) are inspected for a 4-period model. Proposition 2 provides these probabilities N_t, S_t and C_t respectively. The calculations can be found in the appendix, but they are based on calculating the thresholds z_t^l and z_t^h.

Proposition 2: The probabilities N_t, S_t and C_t are given by the equations

$$\begin{aligned} N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_tK}{(1-q_0)(1-K)} - (1-a)\right]\right), \\ S_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_t(1-K)}{(1-q_0)K} - (1-a)\right]\right), \\ C_t &= 1 - N_t - S_t. \end{aligned}$$

Where $w_1 = 1$ and $w_2 \epsilon\, (0, 1)$ is calculated recursively via

$$w_2 = \frac{S_2}{S_2 + C_2}.$$

From now on, the model elaborated in this section is the guideline model for the remainder of the thesis. In other words, the 4-period model with only regular individuals (no influencers) is used as a baseline model. What happens when influencers are active on the network etc. is always compared to the regular 4-period model.

3.2 An influencer 4-period model

In this section, the 4-period model is extended so that influencers are active on the social network as well. Thus, from now on, there are two different types of individuals; (i) regular

individuals and (ii) influencers. The influencer is defined to be an individual in the network that is able to share the message with more than one individual at the same time. She shares the message with all of her F>1 followers.

The dynamics of the diffusion of messages through the network are the following. In period 0, an influencer receives the message, she is the first one to receive this message. Next, in period 1, she has the possibility to either not share the message without inspecting, share the message without inspecting or inspect the message. This choice is represented by her action set $\alpha_{it} \epsilon \{n, s, c\}$. If she chooses to share the message, either with or without first inspecting, the message is passed on to all of her F followers, who are all regular individuals[1]. Next, in period 2, the actions of one of these F followers are highlighted and her behavior is analyzed. This regular individual knows that she received the message from an influencer[2], and the choice she has to make is represented by the action set $\alpha_{rt} \epsilon \{n, s, c\}$. Finally, in period 3, the message is received by another regular individual, if the individual in period 2 chose to share the message. In period 3, however, the behavior of the regular individual is no longer analyzed, since the diffusion of the message stops here. Note that the underlying assumption of this section is that the influencer is the one receiving the message first, and subsequently having the choice to share it with F regular individuals.

The utility function of the influencer looks the following

$$\begin{cases} u^t(1) = Z(F), \\ u^f(0) = 1, \\ u^t(0) = u^f(1) = 0, \end{cases}$$

[1]Assumption 1: Influencers are never interconnected. Therefore, an influencer has F followers, all of these followers are regular individuals.

[2]Assmuption 2: Individuals know who they received a message from, i.e. whether that person is an influencer or a regular individual.

with Z(F) >1 for F>1. Z(F) is the utility an influencer receives from sharing a true message with her F followers, and is increasing in F. Since influencers have more than one follower, the utility they gain from sharing true messages is larger than a regular individual. The index t (f) represents a true (false) message, while the action of the influencer 1 (0) represents that the influencer shares (does not share) the message. The utility function is asymmetric by assumption, meaning that the influencer is rewarded more strongly than regular individuals when sharing true news. However, when sharing fake news, the influencer is punished in the same way as a regular individual is. Using this utility function, the expected utility an influencer receives from choosing a certain action is represented by

$$u_{it}\left(\alpha_{it}\right)=\begin{cases} q_{it} & \alpha_{it}=n, \\ Z\left(F\right)\left(1-q_{it}\right) & \alpha_{it}=s, \\ Z\left(F\right)\left(1-q_{it}\right)+q_{it}-K & \alpha_{it}=c. \end{cases}$$

If the influencer chooses to share the message (with or without inspecting) in period 1, the message is shared with her F followers. In this section, the behavior of one of these F followers is analyzed. The utility this individual gains has not changed relative to the regular 4-period model, and is represented in the following way

$$\begin{cases} u^{t}\left(1\right)=u^{f}\left(0\right)=0, \\ u^{f}\left(1\right)=u^{t}\left(0\right)=1. \end{cases}$$

Next, the expected utility a regular individual gains from choosing a certain action is still

similar to what was modeled in the regular 4-period model, and is represented by

$$u_{rt}\left(\alpha_{rt}\right) = \begin{cases} q_{rt} & \alpha_{rt} = n, \\ 1 - q_{rt} & \alpha_{rt} = s, \\ 1 - K & \alpha_{rt} = c. \end{cases}$$

Finally, since the expected utility for an influencer has changed respectively to the one of a regular individual, it is to be checked whether there is still full monotonicity in the action set of the influencer. For full monotonicity to hold, it has to be the case that the influencer always makes her choice between actions n and c, or between actions s and c, but never directly between n and s. Proof 4 in the appendix shows that full monotonicity for the influencer holds when

$$Z\left(F\right) > K\left[1 + \left(\frac{0.5q_0}{1 - q_0} * \frac{1}{2ab_{i0} + 1 - a - b_{i0}}\right)\right] \tag{1}$$

Now, there are two different scenarios. In the first scenario, condition (1) holds, and thus there is full monotonicity in the action set of the influencer, subsection 3.2.1 deals with this case. In the second scenario, however, condition (1) does not hold, which is dealt with in subsection 3.2.2. The characteristics that both influencers and the social network have to possess in order to fulfill condition (1) are mentioned and elaborated in section 3.3.

3.2.1 Full monotonicity in the influencer's action set

Knowing that condition (1) holds in this subsection, proof 5 in the appendix shows that the probabilities of the influencer taking a certain action are calculated as

$$
\begin{aligned}
N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0K}{(Z(F)-K)(1-q_0)} - (1-a)\right]\right), \\
S_t &= 1 - H\left(\frac{1}{2a-1}\left[\frac{0.5q_0(1-K)}{K(1-q_0)} - (1-a)\right]\right), \\
C_t &= 1 - N_t - S_t.
\end{aligned}
$$

When comparing these probabilities to regular 4-period model, it is clear that the influencer is now more likely to inspect the message. This has a direct positive impact on the quality of news on social media, as fake news are less often shared.

For one of the F regular individuals receiving the message from the influencer, the probabilities of her actions are calculated in the same way as for the regular individual in the regular 4-period model. However, she knows that the received the message from an influencer, this induces her posterior belief that the message is fake, q_{rt}, to change. We note that this belief is given by

$$
q_{rt} = \frac{0.5q_0w_t}{0.5q_0w_t + [ab_{r0} + (1-a)(1-b_{r0})](1-q_0)}.
$$

Now, since the individual knows she received the message from an influencer, w_2 is calculated differently than it was in the regular 4-period model. Here, we see that $w_2 = \frac{S_i}{S_i+C_i}$, with the index 'i' showing that the probabilities of influencers are used. Since C_i increases relative to the regular 4-period model, while S_i remains the same, w_2 is lower than in the regular 4-period model. However, it is clear that w_2 decreases with less than C_i increases. Consequentially, the posterior belief that the message is fake of an individual who receives the message from an influencer, q_{rt}, is lower than in the case that she receives the message

from a regular individual. The probabilities of a regular individual taking a certain action come down to the ones derived in the proof of proposition 2, which are

$$
\begin{aligned}
N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_tK}{(1-K)(1-q_0)} - (1-a)\right]\right), \\
S_t &= 1 - H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_t(1-K)}{(1-q_0)K} - (1-a)\right]\right), \\
C_t &= 1 - N_t - S_t.
\end{aligned}
$$

Note that in the calculations of N_t and S_t, w_t comes into play. Since w_t is lower for individuals who receive the message from an influencer, N_t is also lower, and S_t is higher, leaving C_t unaffected. This means that individuals who received the message from an influencer share fake news more often, having a negative effect on the quality of news on social media. However, since w_2 decreases with less than C_i increases, the effect of regular individuals is smaller than effect of influencers.

To conclude this subsection, it can be stated that the introduction of influencers on social media induces a positive net effect on the quality of news on social media. However, this conclusion can only be drawn when the influencer gains a sufficiently high utility from sharing true messages, relative the other parameters of the model, so that condition (1) holds.

3.2.2 No full monotonicity in the influencer's action set

Again, the main focus is put on the probabilities of the influencer and regular individual taking a specific action. However, condition (1) does not hold in this subsection, implicating there is no full monotonicity in the action set of the influencer. As a result, the probabilities of the influencer are calculated in a different way.

Proof 6 in the appendix shows that the probabilities of the influencer taking a certain

action come down to

$$
\begin{aligned}
N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0K}{(Z(F)-K)(1-q_0)}-(1-a)\right]\right),\\
S_t &= 1-H\left(\frac{1}{2a-1}\left[\frac{0.5q_0}{Z(F)(1-q_0)}-(1-a)\right]\right),\\
C_t &= 1-N_t-S_t.
\end{aligned}
$$

It becomes clear that the influencer is more likely to share the message without inspecting, relative to the regular 4-period model and relative to the influencer 4-period model where condition (1) holds. Proof 6 in the appendix shows that S_t increases more strongly than N_t decreases. This implicates that C_t also decreases, meaning that, relative to the regular 4-period model, the influencer is now less likely to inspecting messages. This has a direct negative impact on the quality of news on social media, as fake news are more often shared.

Again, for a regular individual receiving the message from an influencer, her posterior belief that the message is fake, q_{rt}, changes. Again, since the individual knows she received the message from an influencer, w_2 is different than it was in the regular 4-period model. Since C_i decreases relative to the regular 4-period model, while S_i increases, w_2 is higher than in the regular 4-period model. Consequentially, the posterior belief that the message is fake of an individual who receives the message from an influencer, q_{rt}, is higher than in the case that she receives the message from a regular individual.

As a logical consequence of the expected utility function of regular individuals, there is always full monotonicity in the action set of regular individuals. The probabilities of a regular individual taking a certain action, as the proof of proposition 2 in the appendix

shows, come down to

$$
\begin{aligned}
N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_tK}{(1-K)(1-q_0)} - (1-a)\right]\right), \\
S_t &= 1 - H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_t(1-K)}{(1-q_0)K} - (1-a)\right]\right), \\
C_t &= 1 - N_t - S_t.
\end{aligned}
$$

Since w_t has now risen, relative to the regular 4-period model, the following can be concluded. S_t is now lower than in the regular 4-period model, while C_t remains unaffected. This implicates that the regular individual less often shares messages without inspecting. As a result, regular individuals induce a positive effect on the quality of news on social media, by less often sharing fake news. However, by applying the same logic as in subsection 3.2.1, it can be reasoned that the influencer's effect is more strong than the regular individual's effect, resulting in a net negative effect of the introduction of influencers on social media when condition (1) does not hold.

To conclude this section, it can be stated that the influencer can either have a positive or negative net effect on the quality of news on social media. The potential effect depends on whether or not condition (1) holds. The characteristics of the influencer and social platform that decide whether condition (1) holds or not, are discussed in the next section. To finalize this section, table 1 shows a comparison of the influencer's and regular individual's behavior under the different conditions.

Table 1: Comparison of the scenarios

	Full monotonicity in the action set of the influencer (scenario 1)	No full monotonicity in the action set of the influencer (scenario 2)
	Influencers	
Probability of not sharing without inspecting, N_t	Lower than in the regular 4-period model.	Lower than in the regular 4-period model, identical to the influencer 4-period model where condition (1) holds.
Probability of sharing without inspecting, S_t	/	Higher than in the regular 4-period model and in the influencer 4-period model where condition (1) holds.
Probability of inspecting, C_t	Higher than in the regular 4-period model.	Lower than in the regular 4-period model.
	Regular individuals	
Probability of not sharing without inspecting, N_t	Lower than in the regular 4-period model.	Higher than in the regular 4-period model.
Probability of sharing without inspecting, S_t	Higher than in the regular 4-period model.	Lower than in the regular 4-period model.

	Full monotonicity in the action set of the influencer (scenario 1)	No full monotonicity in the action set of the influencer (scenario 2)
Probability of inspecting, C_t	/	/
Conclusion	The effect of influencers on the quality of news on social media is positive. Despite the fact that regular individuals receiving a message from an influencer partly compensate for this positive impact., the net effect of influencers is still positive.	The effect of influencers on the quality of news on social media is negative. Despite the fact that regular individuals receiving a message from an influencer partly compensate for this negative impact, the net effect of influencers is still negative.

3.3 Influencer and social platform characteristics

The previous section shows that influencers have the potential to incur a positive or negative effect on the quality of news on social media. It is argued that which one of these two potential effects is realized, depends on the characteristics of the specific influencer and social platform. These characteristics are now elaborated. Firstly, the main results are summarized in proposition 3.

Proposition 3: There exists a threshold, $\overline{Z}$, for Z(F), such that

(i) If and only if $Z(F) > \overline{Z}$, influencers inspect messages more often. In this case, introducing an influencer on a social network implies a positive net effect on the quality of news on the social network, as less fake news are shared.

(ii) $\overline{Z}$ is increasing in the parameters K, q_0, a (if and only if $b_{i0} < 0.5$) and b_{i0} (if and only if $a < 0.5$).

(iii) $\overline{Z}$ is decreasing in the parameters a (if and only if $b_{i0} > 0.5$) and b_{i0} (if and only if $a > 0.5$).

The fact that the effects of a and b_{i0} depend on the value of b_{i0} and a, respectively, is shown in the proof of proposition 3 in the appendix. Now, the intuition behind points (ii) and (iii) is discussed, as they show the characteristics of an influencer and social network in which condition (1) does or does not hold. Firstly, point (ii) states that when K and q_0 are high, while a and b_{i0} are both low, Z(F) is not sufficiently high for condition (1) to hold. In this case, the introduction of influencers on the social network incurs a negative net effect on the quality of news on the social network, since more fake news are shared. Secondly, when K and q_0 are relatively low, while a and b_{i0} are relatively high, such that Z(F) is sufficiently high for condition (1) to hold, the presence of influencers on a social network induces a positive net effect on the quality of news on the social network, since less fake news are shared.

The characteristics of an influencer and a social network inducing a positive effect of the presence of influencers on a social network, are the following; (i) high utility for the influencer when sharing a true message, (ii) low inspection costs for the influencer, (iii) low proportion of fake messages on the social network, (iv) high persuasiveness of the messages (i.e. messages with a high probability of being true) and (v) high prior beliefs about the true state of the world (i.e. low bias).

The first three of the aforementioned characteristics are rather obvious and do not need further elaboration. The reasoning behind characteristics (iv) and (v), however, is discussed now. When both the persuasiveness of the messages being spread on the social network (iv) is high and the prior beliefs of the influencer about the true state of the world (v) are

closely aligned to the actual true state of the world, the impact on the quality of news on social media is positive. Important with these two parameters is that the impact of a (b_{i0}) depends on the value of b_{i0} (a). As an illustration, focus is put on what happens when messages come from reliable sources (high persuasiveness) in combination with influencers who have prior beliefs about the true state of the world that are relatively dissimilar to the actual true state of the world (highly biased influencers). In this case, the bulk of the messages being spread come from a credible source and are thus likely to be true. However, because the influencer believes in the false state of the world, she is more likely to prevent the true messages from being spread and is more inclined to share false messages. Consequentially, this would have a negative impact on the quality of news on social media. This reasoning can be applied to the cases where parameter a is low while b_{i0} is high, and where both parameters are low. This way, it becomes clear that, for a and b_{i0} to have a positive impact on the quality of news being spread on social media, both parameters have to be relatively high (i.e. higher than 0.5).

4 Discussion & conclusion

In this chapter, answers are given to the research questions put forward in the introduction. Subsequently, potential policy recommendations are linked to the findings of the thesis. In the final subsection, the thesis is concluded.

4.1 Findings

The first main outcome of the thesis is a 4-period model which enables further analysis of elements that have not yet been investigated. Subsequently, the 4-period model is used to introduce influencers on social media and investigate their impact on the quality of news on social media.

Initially, it was expected that, since influencers gain more utility from sharing true messages, they would incur a positive effect on the quality of news on social media. However, the thesis shows that this effect is less straightforward. It is argued that whether or not the effect the influencers incur is positive, depends on the characteristics the influencer and the social network possess. These characteristics are (i) the influencer's utility from sharing a true message, (ii) the influencer's costs of inspecting a message, (iii) the proportion of fake messages being spread on the social network, (iv) the persuasiveness of the message and (v) the influencer's prior beliefs about the true state of the world (i.e. her bias).

Aditionally, from the results it is clear that the presence of influencers affects the behavior of regular individuals so that their effect on the quality of news on social media partly compensates for the effect influencers have. After all, the influencer's net effect is thus less strong than would be the case without regular individuals.

4.2 Policy implications

In this subsection, it is argued that responsible policies and policymakers have an impact on some of the aforementioned characteristics of influencers and social networks. As such, the characteristics of platforms and influencers can be steered into the direction where the quality of news is improved.

Policymakers can opt to address influencers in a way that the effect of their presence becomes positive. First, there is the possibility of informing influencers by giving them (free) access to high-quality (non-biased) newspapers or news platforms. By doing this, their beliefs about the state of the world will be more closely aligned with the actual true state of the world, and their inspection costs decrease. However, this imposes a threat when the newspapers or news platforms that influencers are granted access to, are the victim of fake news as well. Secondly, initiatives can be set-up to raise the utility influencers receive

when sharing true messages. This can, for example, be done by fostering potential deals between trustworthy media firms and influencers, such that influencers receive a (financial) pay-off from sharing their true messages. Again, it is important that these media firms are credible and that it can be sure that they do not provide the influencers with false messages, as this would have a detrimental effect on the quality of news.

Another option for policymakers is to address social networks with the intention of steering the effect of the presence of influencers on social media into a positive direction. A potential policy to achieve this goal is to increase the accessibility to credible sources of news on the social network, these sources can subsequently be used to verify messages. When these sources are sufficiently accessible on the social network, the inspection costs of influencers decrease.

Finally, strategic partnerships could be formed between influencers and social platforms (Newman, 2011). This way, a more integrated policy towards combating fake news could be designed, by focusing on a strong cooperation between influencers and social media. A transparent cooperation between these two stakeholders induces gains for both parties.

4.3 Conclusion

The literature review makes it clear that there is still a gap in the literature when it comes to certain actors on social media and their impact on the diffusion of fake news. In order to fill one of these gaps, the thesis shows that the role of influencers in the diffusion of fake news should not be forgotten, as they have an impact on the quality of news on social media.

In the thesis, certain assumptions were put on the parameters and on the outlines of the model, in order to make the analysis more insightful and interpretable. However, the effect of these assumptions on the results of the thesis have not been investigated. In order to

evaluate the robustness of the results, some of the assumptions have to be loosened up, and a new analysis has to be made, with less strict assumptions. Firstly, even though the thesis deals with two types of individuals (influencers and regular individuals), it would be more realistic to include a third type of individuals in the model, namely an adverse individual who benefits from spreading fake news. Secondly, another limitation of the thesis is that the model assumes an asymmetric utility function for the influencer. Additionally, future research could, potentially, perform comparative statics with respect to the share of influencers in the population, as to evaluate the impact of different shares of influences on the diffusion of fake news. Finally, the model derived in order to evaluate the impact of influencers can also be used to investigate the impact of other factors on the diffusion of fake news.

The relevance of this thesis lies in showing that the role of influencers should not be forgotten in the public debate on combating fake news, by showing their potential impact. Moreover, not only does the thesis prove that there is an impact, it also shows the mechanisms through which influencers impact the quality of news on social media. Subsequently, policymakers can focus on manipulating these mechanisms when they choose to integrate influencers as a means of combating fake news (on social media). The underlying motive behind this thesis is to start a public debate around new ways of combating the diffusion of fake news on social media. The thesis gives an insight on how this could be done by focusing on influencers active on social media. However, in general, the thesis shows that certain elements and crucial actors, like influencers, should not be forgotten when trying to improve the quality of news on social media.

A Appendix

A.1 Proof 1

This proof is based on the proof of lemma 1 in Papanastasiou (2020). Note first that the beliefs in the model are defined over the set $G := \{(v,\theta)\}_{v\epsilon\{t,f\},\theta\epsilon\{T,C\}}$. According to the model specification, individual i's prior belief is given by

$$P_{i0}(f,T) = q_0 b_{i0}, P_{i0}(f,C) = q_0(1-b_{i0}), P_{io}(t,T) = (1-q_0), P_{i0}(t,C) = (1-q_0)(1-b_{i0}). \tag{2}$$

Suppose an individual receives the message in period $t\epsilon\{1,2\}$. The individual uses two elements to update her beliefs: (i) the message's content, m = "T" (since this is the message of which the diffusion through the network is analyzed in the thesis), and (ii) the fact that the message has been shared by all preceding individuals,which is denoted by A. In period 1, however, the individual is the first individual to receive this message, thus this A does not apply to period 1. For $g\ \epsilon G$, the individual's posterior belief is

$$\begin{aligned} P_{it}\left(g \mid A, "T"\right) &= \frac{P\left(A, "T" \mid g\right) P\left(g\right)}{\sum_{w\epsilon G} P\left(A, "T" \mid w\right) P\left(w\right)} \\ &= \frac{P\left(A \mid "T", g\right) P\left("T" \mid g\right) P\left(g\right))}{\sum_{w\epsilon G} P\left(A \mid "T", w\right) P\left("T" \mid w\right) P\left(w\right)}. \end{aligned}$$

Consider the probabilities in the last expression. P(g) is the individual's prior belief given (2). For p(g) we have

$$P\left("T" \mid (t,T)\right) = a, P\left("T" \mid (t,C)\right) = 1-a, P\left("T" \mid (f,C)\right) = P\left("T" \mid (f,T)\right) = \rho_T = 0.5. \tag{3}$$

Next, let S_t, N_t, C_t represent the probabilities of the period-t individual choosing action s, n, c respectively, conditional on receiving a message of type m = "T" [i.e., $S_t = P\left(\alpha_{it} = s \mid "T", A\right)$,etc.]. If an individual inspects the message, she then shares it with

the next individual if and only if she finds it to be truthful. Therefore,

$$P\left(A \mid \text{"}T\text{"}, (f,T)\right) = P\left(A \mid \text{"}T\text{"}, (f,C)\right) = S_t$$

and

$$P\left(A \mid \text{"}T\text{"}, (t,T)\right) = P\left(A \mid \text{"}T\text{"}, (t,C)\right) = S_t + C_t$$

where we have used that (i) conditional on the message m, the individual's sharing actions depend on v, and (ii) a fake (true) message is shared only by individuals who choose action s (is shared by individuals who choose either action s or action c). Using the above probabilities, it can then be shown that

$$q_{it} = P(f \mid A, \text{"}T\text{"}) = \frac{0.5 q_0 w_t}{0.5 q_0 w_t + \left[a b_{i0} + (1-a)(1-b_{i0})\right](1-q_0)} \tag{4}$$

where we define $w_t = \frac{S_t}{S_t + C_t}$ and note that $w_1 = 1$, since there are no previous-sharing observations in period 1. Existence of the thresholds on b_{i0} stated in the result follows from the strict monotonicity of q_{it} in b_{i0}.

A.2 Proof of proposition 1

The proof of this proposition is based on the proof of proposition 1 in Papanastasiou (2020). Note first that q_{it} is the period-t individual's belief that the message is fake. Secondly, we have normalized the individual's utility from sharing (not sharing) a true (fake) message to one, and to zero otherwise. The period-t individual chooses the action $\alpha_{it} \in \{n, s, c\}$ that maximizes her expected utility. These expected utilities, given her belief q_{it}, are described

for each action as follows:

$$u(\alpha_{it}) = \begin{cases} q_{it} & \alpha_{it} = n, \\ 1 - q_{it} & \alpha_{it} = s, \\ 1 - K & \alpha_{it} = c. \end{cases} \tag{5}$$

Using (5) and proof 1, it is clear that $u_{it}(n) = q_{it}$ is strictly decreasing in b_{i0}, which implies that $u_{it}(s)$ is strictly increasing in b_{io}. Additionally, note also that $u_{it}(c) = 1 - K$. Thus, the period-t individual chooses action n if $q_{it} > 1-K$, she chooses action s if $1-q_{it} > 1-K$, and action c if $1 - K > max\{q_{it}, 1 - q_{it}\}$. The fact that there are three thresholds for b_{io} stated in the result follows from the strict monotonicity of q_{it} in b_{i0}.

A.3 Proof of proposition 2

Let N_t, S_t, C_t denote the probabilities that the period-t individual chooses action n, s, c, respectively, conditional on the message's content m = "T". We have from proof 1 that

$$q_{it} = \frac{0.5 q_0 w_t}{0.5 q_0 w_t + (1 - q_0)\left[a b_{i0} + (1 - a)(1 - b_{i0})\right]}, \tag{6}$$

with $w_1 = 1$ and $w_2 = \frac{S_2}{S_2+C_2}$. The probability N_t can be calculated the following way

$$\begin{aligned}
N_t &= P\left(q_{it} > 1-K\right) \\
&= P\left(\frac{0.5q_0w_t}{0.5q_0w_t + (1-q_0)\left[ab_{i0} + (1-a)\left(1-b_{i0}\right)\right]} > 1-K\right) \\
&= P(0.5q_0w_t > (1-K)\,0.5q_0w_t + (1-K)\left((1-q_0)\,ab_{i0} + \right. \\
&\quad \left.(1-K)\left((1-q_0)\left(1-a\right) + (1-K)\left(1-q_0\right)b_{i0}\left((1-a)\right)\right)\right) \\
&= P\left(0.5q_0w_tK - (1-K)\left(1-q_0\right)\left(1-a\right) > (1-K)\left(1-q_0\right)b_{i0}\left(2a-1\right)\right) \\
&= P\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_tK}{(1-K)\left(1-q_0\right)} - (1-a)\right] > b_{i0}\right) \\
\longleftrightarrow N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_tK}{(1-K)\left(1-q_0\right)} - (1-a)\right]\right),
\end{aligned}$$

The probability S_t can be calculated the following way

$$\begin{aligned}
S_t &= P\left(1-q_{it} > 1-K\right) \\
&= P\left(\frac{\left[ab_{i0} + (1-a)\left(1-b_{i0}\right)\right]\left(1-q_0\right)}{0.5q_0w_t + \left[ab_{i0} + (1-a)\left(1-b_{i0}\right)\right]\left(1-q_0\right)} > 1-K\right) \\
&= P\left(b_{i0} > 1 - \frac{1}{2a-1}\left[\frac{0.5q_0w_t\left(1-K\right)}{\left(1-q_0\right)K} - (1-a)\right]\right) \\
\longleftrightarrow S_t &= 1 - H\left(\frac{1}{2a-1}\left[\frac{0.5q_0w_t\left(1-K\right)}{\left(1-q_0\right)K} - (1-a)\right]\right).
\end{aligned}$$

Finally, the probability C_t is calculated as $C_t = 1 - N_t - S_t$.

A.4 Proof 4

In this proof, it is investigated for which parameter restriction there is full monotonicity in the action set of the influencer. For full monotonicity to hold, it has to be the case that the influencer always makes her choice between actions n and c, or between s and c, but

never directly between n and s. First, it has to be checked that when

$$q_{it} > Z(F)(1 - q_{it}),$$

it also holds that

$$Z(F)(1 - q_{it}) + q_{it} - K > Z(F)(1 - q_{it}).$$

This means that when the expected utility from not sharing the message without inspecting is higher than the expected utility from sharing the message without inspecting, it also holds that the expected utility from inspecting the message is higher than the one from sharing the message without inspecting. Proving this comes down to the following

$$Z(F)(1 - q_{it}) + q_{it} - K > Z(F)(1 - q_{it})$$
$$\longleftrightarrow q_{it} > K$$

We see that when $q_{it} > Z(F)(1 - q_{it})$ holds, q_{it} must automatically be larger than 0.5, and since it is assumed that K<0.5, this condition is automatically fulfilled, without an extra parameter restriction.

Next, is has to be checked that when

$$Z(F)(1 - q_{it}) > q_{it},$$

it also holds that

$$Z(F)(1 - q_{it}) + q_{it} - K > q_{it}.$$

This means that when the expected utility from sharing a message without inspecting is larger than the expected utility from not sharing without inspecting, it also holds that the utility from inspecting is larger than the one from not sharing without inspecting. Proving

this comes down to the following

$$
\begin{aligned}
& Z(F)(1-q_{it})+q_{it}-K>q_{it} \\
\longleftrightarrow & Z(F)>\frac{K}{1-q_{it}} \\
\longleftrightarrow & Z(F)>\frac{K}{1-\frac{0.5q_0}{0.5q_0+[ab_{io}+(1-a)(1-b_{i0})](1-q_0)}} \\
\longleftrightarrow & \frac{Z(F)}{K}>\frac{1}{\frac{[ab_{i0}+(1-a)(1-b_{i0})](1-q_0)}{0.5q_0+[ab_{i0}+(1-a)(1-b_{i0})](1-q_0)}} \\
\longleftrightarrow & \frac{Z(F)}{K}>\frac{0.5q_0+[ab_{i0}+(1-a)(1-b_{i0})](1-q_0)}{[ab_{i0}+(1-a)(1-b_{i0})](1-q_0)} \\
\longleftrightarrow & \frac{Z(F)}{K}>1+\frac{0.5q_0}{[ab_{i0}+(1-a)(1-b_{i0})](1-q_0)} \\
\longleftrightarrow & Z(F)>K\left[1+\left(\frac{0.5q_0}{1-q_0}*\frac{1}{2ab_{i0}+1-a-b_{i0}}\right)\right].(1)
\end{aligned}
$$

When condition (1) holds, there is full monotonicity in the action set of the influencer.

A.5 Proof 5

The probability of the the influencer not sharing the message without inspecting is calculated as the probability that her expected utility from not sharing the message without inspecting is larger than her expected utility from inspecting the message. Therefore, the

probability N_t can be calculated the following way:

$$
\begin{aligned}
N_t &= P\left(q_{it} > Z\left(F\right)\left(1-q_{it}\right)+q_{it}-K\right) \\
&= P\left(q_{it} > Z\left(F\right)+q_{it}\left(1-Z\left(F\right)\right)-K\right) \\
&= P\left(Z\left(F\right)q_{it} > Z\left(F\right)-K\right) \\
&= P\left(q_{it} > 1-\frac{K}{Z\left(F\right)}\right) \\
&= P\left(\frac{0.5q_0}{0.5q_0+\left(1-q_0\right)\left[ab_{i0}+\left(1-a\right)\left(1-b_{i0}\right)\right]} > 1-\frac{K}{Z\left(F\right)}\right) \\
&= P(0.5q_0KZ\left(F\right) > \left(Z\left(F\right)-K\right)0.5q_0+\left(Z\left(F\right)-K\right)\left(\left(1-q_0\right)ab_{i0}+\right. \\
&\quad \left.\left(Z\left(F\right)-K\right)\left(\left(1-q_0\right)\left(1-a\right)+\left(Z\left(F\right)-K\right)\left(1-q_0\right)b_{i0}\left(\left(1-a\right)\right)\right)\right. \\
&= P\left(0.5q_0w_tZ\left(F\right)-\left(Z\left(F\right)-K\right)\left(1-q_0\right)\left(1-a\right) > \left(Z\left(F\right)-K\right)\left(1-q_0\right)b_{i0}\left(2a-1\right)\right) \\
&= P\left(\frac{1}{2a-1}\left[\frac{0.5q_0K}{\left(Z\left(F\right)-K\right)\left(1-q_0\right)}-\left(1-a\right)\right] > b_{i0}\right) \\
\longleftrightarrow N_t &= H\left(\frac{1}{2a-1}\left[\frac{0.5q_0K}{\left(Z\left(F\right)-K\right)\left(1-q_0\right)}-\left(1-a\right)\right]\right).
\end{aligned}
$$

We see that, since Z(F)>1, the influencer is less likely to not share the message without inspecting, relative to the regular 4-period model.

Next, the probability of the influencer sharing the message without inspecting is calculated as the probability that her expected utility from sharing the message without inspecting is larger than her expected utility from inspecting. Therefore, the probability S_t can be

calculated the following way:

$$
\begin{aligned}
S_t &= P\left(Z\left(F\right)\left(1-q_{it}\right) > Z\left(F\right)\left(1-q_{it}\right) + q_{it} - K\right) \\
&= P\left(K > q_{it}\right) \\
&= P\left(K > \frac{0.5q_o}{0.5q_0 + \left[ab_{i0} + (1-a)\left(1-b_{i0}\right)\right]\left(1-q_0\right)}\right) \\
&= P\left(K\left[0.5q_0 + \left[ab_{i0} + (1-a)\left(1-b_{i0}\right)\right]\left(1-q_0\right)\right] > 0.5q_0\right) \\
&= P\left(b_{i0}\left[2aK\left(1-q_0\right) - K\left(1-q_0\right)\right] > 0.5q_0 - K0.5q_0 - K\left(1-a\right)\left(1-q_0\right)\right) \\
&= P\left(Kb_{i0}\left(1-q_0\right)\left(2a-1\right) > 0.5q_0\left(1-K\right) - K\left(1-a\right)\left(1-q_0\right)\right) \\
&= P\left(b_{i0} > \frac{1}{2a-1}[\frac{0.5q_0\left(1-K\right)}{K\left(1-q_0\right)} - \left(1-a\right)\right) \\
\longleftrightarrow S_t &= 1 - H\left(\frac{1}{2a-1}\left[\frac{0.5q_0\left(1-K\right)}{K\left(1-q_0\right)} - \left(1-a\right)\right]\right).
\end{aligned}
$$

We see that this probability is the same as the one found in the proof of proposition 2, meaning that the individual is equally likely to share the message without inspecting than the regular individual is in the regular 4-period model.

Finally, the probability of the influencer inspecting the message, is still calculated as

$$C_t = 1 - N_t - S_t.$$

Since, for the influencer, N_t has decreased and S_t has remained the same, relative to the regular 4-period model, it can be concluded that the influencer is more likely to inspect the message.

A.6 Proof 6

Now that there is no full monotonicity in the action set of the influencer, the calculation of her probabilties of taking a certain action, are different.

Firstly, the probability that the influencer does not share the message without inspecting is still calculated as the probability that the expected utility from not sharing the message without inspecting is higher than the expected utility of inspecting. Since this calculation has not changed, relative to proof 5, it is still

$$N_t = H\left(\frac{1}{2a-1}\left[\frac{0.5q_0K}{(Z(F)-K)(1-q_0)} - (1-a)\right]\right).$$

Secondly, the probability that the influencer shares the message is now calculated as the probability that the expected utility of sharing the message without inspecting is higher than the expected utility of not sharing the message without inspecting. This is caused by the fact that when condition (1) does not hold, the influencer makes a direct choice between action s and n, instead of action s and c. The probability that the influencer shares the message without inspecting is, therefore, calculated

$$\begin{aligned}
S_t &= P\left(Z(F)(1-q_{it}) > q_{it}\right) \\
&= P\left(q_{it} < \frac{Z(F)}{Z(F)+1}\right) \\
&= P\left(\frac{0.5q_0}{0.5q_0 + [ab_{i0} + (1-a)(1-b_{i0})]} < \frac{Z(F)}{Z(F)+1}\right) \\
&= P(0.5q_0(Z(F)+1) < Z(F)0.5q_0 + Z(F)(1-q_0)ab_{i0} + \\
&\quad Z(F)(1-q_0)(1-a) + Z(F)(1-q_0)(ab_{i0} - b_{i0})) \\
&= P\left(0.5q_0(1+Z(F)) - 0.5q_0Z(F) - Z(F)(1-q_0)(1-a) < Z(F)(1-q_0)(2a-1)b_{i0}\right) \\
&= P\left(b_{i0} > \frac{1}{2a-1}\left[\frac{0.5q_0}{Z(F)(1-q_0)} - (1-a)\right]\right) \\
\longleftrightarrow S_t &= 1 - H\left(\frac{1}{2a-1}\left[\frac{0.5q_0}{Z(F)(1-q_0)} - (1-a)\right]\right).
\end{aligned}$$

In order to draw further conclusions on the magnitude of the increase of S_t, we have to inspect whether this S_t increases more strongly than N_t decreases, relative to the regular 4-period model.

On the one hand, it is observable that S_t changes with factor $\frac{(1-K)Z(F)}{K}$. On the other hand, we see that N_t changes with factor $\frac{1-K}{Z(F)-K}$. Thus, wee see that the change in S_t is bigger than the change in N_t if and only if

$$\begin{aligned}
&\frac{(1-K)\,Z\,(F)}{K} > \frac{1-K}{Z\,(F)-K} \\
\longleftrightarrow &\frac{(1-K)}{K} > \frac{(1-K)}{Z\,(F)\,(Z\,(F)-K)} \\
\longleftrightarrow &\frac{1}{K} > \frac{1}{Z\,(F)\,(Z\,(F)-K)} \\
\longleftrightarrow &Z\,(F)\,(Z\,(F)-K) > K.
\end{aligned}$$

Knowing that $Z\,(F) \geq 1$ and $K < 0,5$, it becomes clear that this is always the case.

Now, it is clear that the influencer is more likely to share the message without inspecting, relative to the regular 4-period model and relative to the influencer 4-period model where condition (1) holds.

Finally, the probability of the influencer inspecting the message is still calculated as

$$C_t = 1 - N_t - S_t.$$

Since we know that S_t increases more strongly than N_t decreases, it is clear that the influencer is less likely to inspect the message.

A.7 Proof of proposition 3

We know from proof 4 that there is full monotonicity in the action set of the influencer when the following condition holds

$$Z\,(F) > K\left[1 + \left(\frac{0.5q_0}{1-q_0} * \frac{1}{2ab_{i0} + 1 - a - b_{i0}}\right)\right].$$

This means that there is a critical value $\overline{Z}$, for Z(F), such that for all $Z(F) > \overline{Z}$ there is full monotonicity in the action set of the influencer. We see that this critical value is the following

$$\overline{Z} = K\left[1 + \left(\frac{0.5q_0}{1-q_0} * \frac{1}{2ab_{i0} + 1 - a - b_{i0}}\right)\right].$$

From this equation, it becomes clear that $\overline{Z}$ is increasing in K and q_0. The impact of a and b_{i0} on this threshold $\overline{Z}$, however, is less straightforward. To decide upon the impact of a and b_{i0} on $\overline{Z}$, the derivatives of $\overline{Z}$ with respect to a and b_{i0} are now calculated.

First, the derivative of $\overline{Z}$ with respect to a is calculated as

$$\begin{aligned}\frac{\delta\overline{Z}}{\delta a} &= K\frac{0.5q_0}{1-q_0} * \frac{-(2b_{i0}-1)}{(2ab_{i0}+1-a-b_{i0})^2} \\ &= K\frac{0.5q_0}{1-q_0} * \frac{1-2b_{i0}}{(2ab_{io}+1-a-b)^2}.\end{aligned}$$

The effect of a on $\overline{Z}$ is positive in the case that b_{i0} is smaller than 0.5, since the denominator is always positive. Conversely, a has a negative effect on $\overline{Z}$ when b_{i0} is larger than 0.5. Finally, when b_{i0} equals 0.5, a has no effect on $\overline{Z}$.

Next, the derivative of $\overline{Z}$ with respect to b_{i0} is calculated as

$$\begin{aligned}\frac{\delta\overline{Z}}{\delta b_{i0}} &= K\frac{0.5q_0}{1-q_0} * \frac{-(2a-1)}{(2ab_{i0}+1-a-b_{i0})^2} \\ &= K\frac{0.5q_0}{1-q_0} * \frac{1-2a}{(2ab_{i0}+1-a-b_{i0})^2}.\end{aligned}$$

The effect of b_{i0} on $\overline{Z}$ is positive in the case that a is smaller than 0.5, since the denominator is always positive. Conversely, b_{i0} has a negative effect on $\overline{Z}$ when a is larger than 0.5. Finally, when a equals 0.5, b_{i0} has no effect on $\overline{Z}$.

References

[1] Allcott, H., & Gentzkow, M. (2017). Social Media and Fake News in the 2016 Election. *Journal of Economic Perspectives*, *31*(2), 211-236. doi:10.1257/jep.31.2.211

[2] Arun, C. (2019). On WhatsApp Rumours and Lynchings. *Economic & Political Weekly*, *54*(6), 30-35.

[3] Aymanns, C., Foerster, J., & Georg, C.-P. (2017). Fake news in social networks. *SSRN Electronic Journal*. doi: 10.2139/ssrn.3023320

[4] Baym, G. (2005). The Daily Show: Discursive Integration and the Reinvention of Political Journalism. *Political Communication*, *22*(3), 259-276. https://doi.org/10.1080/10584600591006492

[5] Bjork, U. J. (2001). "Sweet is the Tale". *American Journalism*, *18*(4), 13-27. doi:10.1080/08821127.2001.10739336

[6] Bloch, F., Demange, G., & Kranton, R. (2018). Rumors and Social Networks. *International Economic Review*, *59*(2), 421-448. https://doi.org/10.1111/iere.12275

[7] Campbell, A., Leister, C. M., & Zenou, Y. (2019). *Social Media and Polarization*. http://dx.doi.org/10.2139/ssrn.3419073

[8] Casaló, L. V., Flavián, C., & Ibáñez-Sánchez, S. (2018). Influencers on Instagram: Antecedents and consequences of opinion leadership. *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2018.07.005

[9] Ellman, M., & Germano, F. (2009). What do papers sell? a model of advertising and media bias. *The Economic Journal, 119*(573), 680–704 https://doi.org/10.1111/j.1468-0297.2009.02218.x

[10] Gelfert, A. (2018). Fake news: A Definition. *Informal Logic*, *38*(1), 84-117. https://doi.org/10.22329/il.v38i1.5068

[11] Johnson, M. S. (1998). Gender, Race and Rumours: Re-examining the 1943 Race Riots. *Gender & history*, *10*(2). https://doi.org/10.1111/1468-0424.00099

[12] Kyung-Sun, K., EunYoung, Y.-L., & Sei-Ching, J. S. (2011). *Social Media as Information Source: Undergraduates' use and Evaluation Behavior.* https://doi.org/10.1002/meet.2011.14504801283

[13] Merlino, L. P., & Tabasso, N. (2019). Debunking Rumors in Networks. *University Ca' Foscari of Venice, Dept. of Economics* Research Paper Series No. 29/WP/2019. http://dx.doi.org/10.2139/ssrn.3469490

[14] Newman, N. (2011). Mainstream media and the distribution of news in the age of social discovery: *Reuters institute for the study of journalism*, *Department of Politics and International Relations, University of Oxford.*

[15] Örnebring, H., & Jönsson, A. M. (2004). Tabloid journalism and the public sphere: a historical perspective on tabloid journalism. *Journalism Studies*, *5*(3), 283-295. https://doi.org/10.1080/1461670042000246052

[16] Papanastasiou, Y. (2020). Fake News Propagation and Detection: A Sequential Model. *Management Science*, *66*(5), 1826-1846. https://doi.org/10.1287/mnsc.2019.3295

[17] Pollok, A. (2017). *Roman Propaganda in the Age of Augustus.* (Master's thesis, Dominican University of California). Retrieved from https://scholar.dominican.edu/senior-theses/76/

[18] Potthast, M., Gollub, T., Komlossy, K., Schuster, S., Wiegmann, M., Garces Fernandez, E. P., . . . Stein, B. (2018). Crowdsourcing a Large Corpus of Clickbait on Twitter.

[19] Tandoc, E. C., Lim, Z. W., & Ling, R. (2017). Defining "Fake News". *Digital Journalism*, *6*(2), 137-153. https://doi.org/10.1080/21670811.2017.1360143

[20] Thornton, B. (2000). A short guide to the history of 'fake news' and disinformation. *Journal of Mass Media Ethics*, *15*(2), 89-100.

[21] Wood, M. J., & Douglas, K. M. (2013). "What about building 7?" A social psychological study of online discussion of 9/11 conspiracy theories. *Front Psychol*, *4*(409). doi:10.3389/fpsyg.2013.00409

[22] Zannettou, S., Sirivianos, M., Blackburn, J., & Kourtelis, N. (2019). The Web of False Information: Rumors, Fake News, Hoaxes, Clickbait and Various Other Shenanigans. *Journal of Data and Information Quality*, *11*(3). https://doi.org/10.1145/3309699

Part II

Summary in Dutch

Inleiding

De opkomst van fake news is geen recent fenomeen, het bestaan ervan was reeds bekend in het Romeinse rijk (Pollok, 2017). Echter, de dag van vandaag wordt er meer dan ooit aandacht besteed aan de impact van fake news op zowel politiek, sociaal en economisch vlak. Deze verhoogde aandacht is te wijten aan het feit dat fake news in het digitale tijdperk meer opportuniteiten krijgen om zich te verspreiden, en ook de impact ervan groter is dan vroeger. Dit heeft veel te maken met de enorme draagwijdte die de opkomst van sociale media met zich meebrengt.

Sociale media brengen miljoenen gebruikers samen op hetzelfde platform, dit geeft de gebruikers ervan de kans om zelf nieuws te verspreiden, zonder er eerst gecontroleerd wordt of dit nieuws wel waarheidsgetrouw is. Bovendien brengt de opkomst van sociale media ook vele nieuwe actoren met zich mee, deze actoren kunnen een invloed hebben op de verspreiding van fake news op sociale media. Zo zijn er bijvoorbeeld influencers, die vaak miljoenen volgers hebben en als gevolg ook een zeer groot bereik hebben. De impact van influencers op het koopgedrag van hun volgers is reeds meermaals bewezen (Casaló, Flavián, & Ibáñez-Sánchez, 2018). Het lijkt dus niet onlogisch dat influencers ook in bepaalde mate het gedrag van hun volgers beïnvloeden in termen van welk soort nieuws ze consumeren. Op deze manier kunnen influencers een potentiele impact hebben op de verspreiding van fake news op sociale media. Echter, de invloed van influencers op de kwaliteit van nieuws op sociale media is nog maar zelden wetenschappelijk bestudeerd. Het doel van de thesis is om deze lacune in de literatuur te verkleinen en een discussie aan te wakkeren om nieuwe

manieren in beschouwing te nemen bij het bestrijden van fake news. De relevantie van deze thesis ligt dus in het analyseren van nieuwe elementen en actoren die bijdragen aan het verspreiden van (fake) news.

Als gids doorheen de theoretische analyse, worden er antwoorden gezocht op volgende onderzoeksvragen:

1. Wat is de impact van influencers op de kwaliteit van nieuws op sociale media?
2. Is het mogelijk om deze impact in een (meer) positieve richting te sturen door bepaalde eigenschappen van influencers en sociale media te manipuleren?

In hoofdstuk 2 wordt de bestaande literatuur die de verspreiding van (fake) news doorheen een netwerk modelleert, in kaart gebracht. Hierna, in hoofdstuk 3, wordt een model gegenereerd waarop verdere analyse gebouwd wordt. Op dit model worden vervolgens influencers geïntroduceerd. Op deze manier wordt de impact van influencers op de kwaliteit van nieuws op sociale media geëvalueerd. Daarna, in hoofdstuk 4, worden de resultaten bediscussieerd en ook geïnterpreteerd in een beleidscontext. Tenslotte wordt de thesis geconcludeerd.

Literatuurstudie

Fake news is een breed concept, die vele verschillende varianten omvat. De criteria waaraan nieuws moet voldoen om onder deze noemer te vallen, worden gehaald uit de definitie die Gelfert (2018, pp.85-86) geeft aan fake news, namelijk “een opzettelijke representatie van foute of misleidende informatie, waarbij de misleiding met voorbedachte rade gebeurt”.

In deze sectie worden de verschillende modellen opgelijst die de verspreiding van fake

news op sociale media in kaart brengen. Van ieder model wordt ook toegelicht wat de toegevoegde waarde ervan is voor de literatuur.

Ieder model begint met een zekere staat waarin de wereld zich bevindt. Meer concreet betekent dit dat er een aspect van de wereld is waarover informatie beschikbaar is. De staat waar de wereld zich werkelijk in bevindt, wordt weergegeven door θ. Vervolgens kan deze θ twee mogelijke waarden aannemen (1 of 0, bijvoorbeeld). Hierna zijn er drie fasen die ieder model, vaak op een verschillende manier, behandelt. De eerste fase vangt aan wanneer een individu een bericht ontvangt, dit bericht bevat steeds informatie over θ. De tweede fase gaat van start nadat het individu het bericht gelezen heeft. In deze fase moet het individu bepaalde keuzes maken. Namelijk, het individu moet eerst en vooral kiezen of hij/zij het bericht inspecteert (i.e. fact-checkt), en vervolgens ook of hij/zij het bericht deelt met een volgend individu. De derde fase treedt aan wanneer het individu zijn/haar keuze gemaakt heeft, en hiervan de pay-offs ontvangt en potentieel ook feedback krijgt over de werkelijke staat waarin de wereld verkeert.

Uit deze literatuurstudie wordt besloten om een model uit te bouwen dat vier perioden bevat. Deze perioden worden uitgelicht in het volgende hoofdstuk en zijn sterk gebaseerd op de drie fases die voortkomen uit de literatuurstudie.

Methodologie & analyse

In dit hoofdstuk worden enkele stappen ondernomen opdat het effect van influencers op de kwaliteit van nieuws op sociale media geëvalueerd kan worden. Een model wordt gebouwd, gebaseerd op de structuur van Papanastasiou (2020), maar waarbij verschillende mechanismen en assumpties aangepast worden. Vervolgens worden influencers geïntroduceerd binnen dit model en wordt op deze manier hun impact bestudeerd.

Model met vier perioden

Verschillende stappen worden uitgevoerd om een model met slechts vier perioden te genereren. Het doel hiervan is om verdere analyse sterk te vereenvoudigen en de resultaten beter te kunnen interpreteren. De vier perioden die het model nog bevat zijn (i) periode 0: het individu ontvangt een bericht, (ii) periode 1: het individu kiest zijn/haar acties (inspecteren en/of delen van het bericht), (iii) periode 2: indien het bericht gedeeld werd, ontvangt in deze periode een tweede individu het bericht en wordt deze ook geconfronteerd met dezelfde keuzes, en (iv) indien het bericht in iedere vorige periode gedeeld werd, ontvangt een nieuw individu het bericht in periode 3.

Model met vier perioden en influencers

In deze sectie worden influencers toegevoegd aan het model met vier perioden. Vanaf nu zijn er twee typen individuen actief op het sociale netwerk; (i) normale individuen en (ii) influencers. Er wordt verondersteld dat, terwijl normale individuen het bericht kunnen delen met één andere individu, influencers het bericht kunnen delen met al hun 'F' volgers. Aangezien influencers het bericht nu met meerdere individuen kunnen delen, is het nut dat ze verkrijgen door het delen van een waarheidsgetrouw bericht ook groter. Normale individuen ontvangen een nut dat gelijk is aan 1 bij het delen van een waarheidsgetrouw bericht. Echter, influencers ontvangen een nut gelijk aan $Z(F)>1$ wanneer ze een bericht delen dat de waarheid bevat, waarbij $Z(F)$ stijgend is in F.

De dynamiek van het model verloopt nu als volgt. In periode 0 ontvangt de influencer een bericht. Vervolgens, in periode 1, maakt de influencer zijn/haar keuze om het bericht al dan niet te inspecteren en/of te delen met F individuen. In periode 2, worden de keuzes van een normaal individu geanalyseerd, indien de influencer ervoor koos om het bericht te delen. Tenslotte, in periode 3, ontvangt een normaal individu het bericht, in het geval

dat het bericht in iedere voorgaande periode gedeeld werd. Merk op dat dit één van de belangrijkste assumpties van het model is, namelijk dat de influencer als eerste het bericht ontvangt, en vervolgens de keuze heeft om het bericht te delen met F normale individuen. De actieset van zowel influencers als van normale individuen bestaat uit drie mogelijke acties. De eerst mogelijke actie bestaat erin het bericht niet te inspecteren, en vervolgens ook niet te delen, i.e. actie 'n'. De tweede actie is het niet inspecteren van het bericht, maar vervolgens het bericht wel te delen, i.e. actie 's'. Als laatste kan er ook gekozen worden om het bericht te inspecteren, en vervolgens de gepaste actie te ondernemen (delen als het bericht de waarheid bevat, niet delen als het bericht de waarheid niet bevat), i.e. actie 'c'. De actie set wordt hierdoor weergegeven als $\alpha \epsilon \{n, s, c\}$.

Vervolgens worden de kansen berekend dat een influencer of een normaal individu een specifieke actie onderneemt, in functie van de parameters van het model. Vooraleer deze kansen berekend kunnen worden, wordt nagegaan of er sprake is van volledige monotoniciteit in de actieset van influencers. Volledige monotoniciteit betekent dat het individu steeds een keuze maakt tussen acties n en c, of tussen acties s en c, maar nooit rechtstreeks tussen acties n en s. Er wordt bewezen dat dit het geval is wanneer een bepaalde parameterrestrictie (1) geldt. Eerst wordt het geval behandeld waar restrictie (1) geldt, en er dus sprake is van volledige monotoniciteit in de actie set. Hierna wordt het geval behandeld waar restrictie (1) niet geldt. In welke verschillende omstandigheden deze restrictie al dan niet geldt, wordt op teruggekomen later in de analyse en de discussie.

Scenario 1: Volledige monotoniciteit in de actieset van influencers

Indien restrictie (1) geldt, en er dus sprake is van volledige monotoniciteit in de actieset van influencers, wordt bewezen dat influencers het bericht vaker inspecteren dan een normaal individu. Het wordt dus duidelijk dat, in dit scenario, influencers een positief effect hebben

op de kwaliteit van nieuws op sociale media, aangezien berichten vaker geïnspecteerd worden. Op deze manier worden fake news minder vaak verspreid.

Hierna wordt het gedrag van een normaal individu bestudeerd, die het bericht ontvangt van een influencer. Het wordt duidelijk dat dit normaal individu vaker het bericht deelt zonder het te inspecteren. Dit heeft een negatieve impact op de kwaliteit van nieuws op sociale media aangezien fake news vaker verspreid worden op deze manier. Echter, het effect van influencers op de kwaliteit van nieuws is groter dan het effect van normale individuen. Als gevolg compenseert het normale individu dus wel gedeeltelijk voor het influencer-effect, maar kan niet het gehele effect wegnemen. In dit scenario is het netto effect van de introductie van influencers op sociale media dus positief.

Scenario 2: Geen volledige monotoniciteit in de actieset van influencers

Indien restrictie (1) niet geldt, en er dus geen sprake is van volledige monotoniciteit in de actieset van influencers, wordt het duidelijk dat influencers vaker het bericht delen zonder het te inspecteren, en minder vaak het bericht inspecteren. Het is dus duidelijk dat in dit scenario, de influencer een negatieve impact heeft op de kwaliteit van nieuws op sociale media, aangezien fake news vaker verspreid worden.

Ook in dit scenario wordt vervolgens het gedrag van een normaal individu bestudeerd, die het bericht ontvangt van de influencer. Het wordt duidelijk dat, dankzij een verhoogde kans dat het normale individu het bericht beschouwd als fake news, het normale individu het bericht minder vaak deelt zonder te inspecteren. Merk dus op dat het normale individu hier voor een positief effect op de kwaliteit van nieuws op sociale media zorgt, aangezien fake news minder vaak verspreid worden. Andermaal is ook het effect van het normale individu minder sterk dan dat van de influencer. Als gevolg is de netto impact van influencers op de kwaliteit van nieuws op sociale media negatief, in dit scenario.

Karakteristieken van influencers en sociale media

Het is duidelijk dat influencers zowel een positief als negatief effect kunnen hebben op de kwaliteit van nieuws op sociale media. De specifieke kenmerken van zowel het sociale netwerk als van de influencer in kwestie bepalen welke van de twee mogelijke effecten aanwezig is. Om van een positief influencer-effect te kunnen spreken moet eerst en vooral het nut dat de influencer ontvangt door het delen van een waarheidsgetrouw bericht relatief groot zijn. Ten tweede moeten de inspectiekosten, gepaard gaande met het inspecteren van een bericht, voor de influencer relatief laag zijn. Ten derde moet er sprake zijn van een laag percentage fake news dat verspreid wordt op het sociale netwerk. Ten vierde moeten de berichten relatief waarheidsgetrouw zijn. Als laatste moet de influencer een visie hebben op de staat van de wereld die relatief dichtbij de werkelijke staat van de wereld ligt. Indien de influencer en het sociale platform in kwestie aan deze voorwaarden voldoen, heeft de influencer een positief effect op de kwaliteit van nieuws op sociale media.

Discussie & conclusie

Dit hoofdstuk spitst zich toe op het beantwoorden van de onderzoeksvragen en het formuleren van mogelijke beleidsimplicaties die voortvloeien uit de resultaten.

Resultaten

Een eerste resultaat is een model dat vier perioden bevat en waarop verschillende extensies gebouwd kunnen worden. De extensie die deze thesis behandelt is het introduceren van influencers op sociale media, en op deze manier wordt de impact ervan geëvalueerd.

In de analyse werd aangetoond dat het effect van influencers op de kwaliteit van nieuws op sociale media zowel positief als negatief kan zijn. Dit effect wordt bepaald door de volgende

vijf elementen; (i) het nut dat influencers verkrijgen door het delen van waarheidsgetrouwe berichten, (ii) de inspectiekosten van influencers, (iii) de proportie fake news dat verspreid wordt op het sociale netwerk, (iv) de betrouwbaarheid van de berichten en (v) de visie van de influencer op de staat van de wereld.

Een laatste belangrijk resultaat dat de thesis vooropstelt is het feit dat ook normale individuen een verhoogd effect hebben op de kwaliteit van nieuws op sociale media, als gevolg van de introductie van influencers op sociale media. Dit effect doet bovendien steeds het initiële influencer-effect deels teniet.

Beleidsimplicaties

In deze sectie wordt beredeneerd wat de bevindingen van deze thesis mogelijks kunnen betekenen voor beleidsmakers. Hierbij wordt gekeken naar de karakteristieken die een influencer en een sociaal netwerk moeten bezitten opdat het effect van de influencer op de kwaliteit van nieuws positief is. Het doel van een vernieuwend beleid moet zijn om deze karakteristieken te sturen in een positieve richting.

Het is mogelijk voor beleidsmakers om influencers te informeren door hen voldoende toegang te geven tot waarheidsgetrouwe berichten op betrouwbare media. Op deze manier verlagen zowel de inspectiekosten voor de influencer en komt zijn/haar visie op de wereld dichter te liggen bij de werkelijke staat van de wereld. Een andere optie is ervoor zorgen dat het nut dat influencers verkrijgen door waarheidsgetrouwe berichten te verspreiden, te verhogen. Dit kan gebeuren door partnerships te kweken tussen influencers en bepaalde media waarbij influencers een (financiële) prikkel krijgen om waarheidsgetrouwe berichten te verspreiden. Daarnaast is het ook mogelijk voor beleidsmakers om de toegankelijkheid van betrouwbare bronnen op sociale media te verhogen. Op deze manier verlagen de inspectiekosten op het sociale netwerk. Over het algemeen moet het de bedoeling zijn om

strategische partnerships te creëren tussen influencers en sociale netwerken, op deze manier kan een geïntegreerd beleid uitgetekend worden om fake news te bestrijden.

Conclusie

De thesis toont aan dat de impact van influencers op de kwaliteit van nieuws op sociale media niet uitsluitend positief of negatief is, maar afhangt van bepaalde kenmerken. Er werd bewezen dat niet enkel de influencer, maar ook de normale individuen, een verhoogde impact hebben als gevolg van de aanwezigheid van influencers op sociale media.

Tijdens de analsye van de thesis werden bepaalde assumpties gemaakt met betrekking tot de variabelen en het model zelf. Het effect van deze assumpties op de resultaten werd niet onderzocht, aangezien dit buiten de scope van de thesis ligt. Echter, om van robuuste resultaten te kunnen spreken, zouden enkele van deze assumpties versoepeld moeten worden. Hierna kan de analyse opnieuw uitgevoerd worden om de impact van de initiële assumpties te evalueren. Een belangrijke assumptie waarvan de impact geëvalueerd moet worden, is de asymmetrie in de nutsfunctie van influencers.

De relevantie van deze thesis ligt in het aantonen dat de rol van influencers niet vergeten mag worden in de strijd tegen fake news. Er zijn echter nog meer actoren en elementen die een potentiële impact hebben, maar waar niet voldoende onderzoek naar verricht wordt. Het is de bedoeling van deze thesis om een debat aan te wakkeren waarbij onconventionele manieren ook gebruikt kunnen worden in het tegengaan van fake news.

Universiteit Antwerpen

Verklaring op woord van eer

Ik verklaar dat ik deze aan de Faculteit BE ingediende masterproef zelfstandig en zonder hulp van andere dan de vermelde bronnen heb gemaakt.

Ik bevestig dat de direct en indirect overgenomen informatie, stellingen en figuren uit andere bronnen als zodanig aangegeven zijn in overeenstemming met de richtlijnen over plagiaat in de Handleiding masterproef.

Ik bevestig dat dit werk origineel is, aan geen andere onderwijsinstelling werd aangeboden en nog niet werd gepubliceerd.

Ik ben mij bewust van de implicaties van fraude zoals beschreven in artikel 15 van het onderwijs- en examenreglement van de Universiteit Antwerpen. (www.uantwerpen.be/oer)

Datum 5 juni 2020

Naam Yannick Jansen - 20152294