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ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

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THE SPREAD OF FAKE NEWS:

A case study of the Presidential Elections of 2018 in Brazil

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Thesis presented to Escola de Administração de Empresas de São Paulo of Fundação Getulio Vargas, as a requirement to obtain the title of Master in International Management (MPGI).

Knowledge Field: Internationalization of Companies

Adviser: Prof. Dr. Umesh Dilip Kumar Mukhi

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ABSTRACT

As fake news becomes more pervasive with the increasing adoption of digital platforms, understanding how disinformation spread and the factors that contribute to its continuation has become crucial, given the detrimental effects for democracies.

This study investigates the spread of fake news during the Presidential Elections of 2018 in Brazil and how distinct social media and websites are used as distribution platforms and sources of disinformation. For such, a pre-existing data set of 346 fake news stories collected during the elections served as a starting point. Initially, through a reverse search process, the main websites responsible for disseminating disinformation were mapped. These sources were then analysed in terms of traffic and partisanship.

Beyond a prevalence of right-wing fake news sources, a high concentration of web traffic was found. Five websites were responsible for almost 80% of all pageviews (or impressions) from all the 58 identified fake news sources. Furthermore, in order to investigate the circulation of disinformation on Facebook, Twitter and WhatsApp, the data set was filtered into the 58 most relevant unique fake news stories, which were later classified by political bias, engagement (number of shares), and segregated in four narratives.

Firstly, it was found that all the analysed social media served as relevant distribution platforms for fake news, once 32 out of the 58 fake news stories circulated in all of them. Yet, Facebook was found to be more relevant than Twitter for that purpose.

Secondly, the four major narratives that shaped the fake news stories were mostly related to an intense polarization and declining rates of trust in public institutions and media vehicles. Among these, fake news related to anti-left/anti-workers were predominant.

Similarly to the first analysis, partisanship was noticeable during the spread of disinformation, as there were ten times more pro-Bolsonaro (or anti-Haddad) fake news stories than the polar opposite.

Finally, the findings indicate that, while Facebook and Twitter were relevant distribution platforms, WhatsApp had a major impact on closed groups due to the reinforced cognitive effects and externalities that corroborate to the susceptibility and spread of fake news on social media.

KEY WORDS: fake news, disinformation, presidential elections, social media, sources, distribution platforms, spread, susceptibility, partisanship

RESUMO

A crescente adoção das plataformas digitais tem impulsionado a ascensão das *fake news*, tornando, portanto, essencial que se entenda como a desinformação se espalha e quais os fatores que contribuem para que o fenômeno continue, dadas as implicações à democracia.

Este estudo investiga a disseminação de *fake News* durante as eleições presidenciais de 2018 no Brasil e como distintas redes sociais e websites foram usados como fontes e plataformas de distribuição de desinformação. Para isso, um banco de dados de 346 *fake news*, coletadas em um estudo durante as eleições, serviu como ponto de partida. Inicialmente, por meio de uma busca reversa, os principais sites responsáveis por espalhar *fake news* foram mapeados. Essas fontes foram então analisadas em termos de tráfego gerado e viés político.

Além da prevalência de fontes de direita, o estudo encontrou uma alta concentração de tráfego. Cinco websites foram responsáveis por quase 80% de todas as impressões (*pageviews*) dentre as 58 fontes de desinformação mapeadas.

Posteriormente, para que se investigasse a circulação de desinformação nas redes Facebook, Twitter e WhatsApp, o banco de dados foi filtrado a 58 *fake news únicas* mais relevantes, que foram em sequência classificadas de acordo com viés político, engajamento (compartilhamentos), e segregadas em quatro narrativas.

Primeiramente, foi constatado que todas as mídias sociais analisadas serviram como relevantes plataformas de distribuição de *fake news*, uma vez que 32 das 58 histórias circularam em todas elas. No entanto, o Facebook mostra-se mais relevante que o Twitter para este fim.

Em seguida, constatou-se que as quatro narrativas que moldam as principais *fake news* estavam relacionadas à intensa polarização, ao declínio da confiança nas instituições públicas e nos veículos midiáticos mais tradicionais.

Similarmente à primeira análise, o nota-se o característico viés político na disseminação de desinformação, uma vez que havia dez vezes mais *fake news* pro-Bolsonaro (ou anti-Haddad) do que o oposto.

Por fim, os resultados também indicam que, enquanto o Facebook e o Twitter foram importante plataformas para a distribuição de *fake news*, o WhatsApp teve um impacto mais significativo em grupos fechados, uma vez que reforça os efeitos cognitivos e externalidades que corroboram para a suscetibilidade e ao compartilhamento de *fake news* nas redes sociais.

PALAVRAS-CHAVE: *fake news*, desinformação, eleições presidenciais, mídias sociais, fontes, plataformas de distribuição, disseminação, suscetibilidade, partidarismo

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1. Introduction

During the last decades, the online environment has dramatically helped to shape news consumption behaviors (Goyanes, 2019). The ubiquitous use of Internet has driven the widespread adoption of social platforms, which are now seen as efficient way to access the news. The rapid decline on the consumption of traditional media among paper and television has also led researchers to speculate about the prevalence of new media over traditional vehicles (Jang et al., 2016).

For a growing number of individuals, the social media have begun to be regarded as main sources of news. Due to the empowering possibility of reporting a fact or an event and reach a mass audience, non-journalists, individuals with no technical or journalistic background can now engage on producing and delivering their news. Thus, a new competition source from bloggers and influencers arises in the journalistic field (Tandoc et al., 2017).

Indeed, the power and capacity of online and social media to massively influence our *weltanschauung* (worldview) have never been higher. According to the Reuters Institute Digital News Report (2020), 55% of people in 40 countries around the world use social media as a source of news, and more than 14% use social media as their main source. These patterns are particularly high in Brazil, where social media overtook television in terms of media consumption for news for the first time. Currently, 67% of the country's population gets news from some social media, surpassing other news types of media such as television (66%) or newspapers (23%). Interestingly, regarding online news consumption, the access through smartphones is unquestionably higher (76%) than from desktop devices (43%). Such situation is the opposite from no more than five years ago, when smartphones were the main choice for only 23% of people. Considering the lightning pace of information spread driven by social media, such pattern may be well explained by the sparkling increase in internet accessibility and information-seeking motivations (Go et al., 2015).

Given the possibility of accessing endless sources of news in a wide range of platforms, the concern with "what is true or false" or misinformation is at global scale. According to the Reuters Institute (2020), only 38% of people worldwide trust in news and an even lesser amount trust on those published in social media (22%). In Brazil, an astonishing 84% of population is concerned about such authenticity. This data sheds a light on an old and social problem brought in a new form. While misinformation, lies and hoaxes are well-known and long existing attempts to influence the common public opinion, fake news are showing an

unprecedented harm potential in the age of social networks. This has led academics and scholars to concern about the dissemination of large volumes of potentially false content (Baum et al., 2017), triggering a misinformation phenomenon, (Darnton, 2017) and consequently breaching the possibility to manipulate the public's perceptions (Gu, et al., 2017).

After becoming popularized and even politicized, now the term fake news has diverse meanings. Such was the inflammatory adoption of the expression - nominated Collins Dictionary's word of the year 2017 (Flood, 2018) - that even researchers and institutions have distinct views about it. A simpler interpretation would be to translate it into false stories, as Facebook does ('How Is Facebook Addressing False Information through Independent Fact-Checkers?', 2020). Nevertheless, scholars and journalists have struggled to reach a consensus.

However, beyond technical definitions, the consequences generated by the dissemination of those news on different spheres of society are preoccupying. Fake news is a complex problem with a variety of implications. A vastly cited example was its spread during the 2016 US presidential elections and the engagement generated by them in Facebook, being greater for fake news stories than for the top 20 real ones (Silverman, Strapagiel, Shaban, & Hall, 2016).

The insertion of fake news in the political agenda and its further impact on voting decision is not a novelty (Balmas, 2014). In Brazil, a study has shown that, among those who voted for the elected president Jair Bolsonaro during the 2018 campaign, nearly all of them were exposed to one or more pieces of fake news and believed that those were based on real facts (Avaaz, 2018).

A less explored implication of misinformation is their economic cost to businesses. In 2017, a mistaken report from ABC news led Democrats to call for Trump's impeachment (CNBC - David, 2017) and, following that fact, the S&P 500 (the weighted index of the 500 largest U.S. publicly traded companies) dropped by 38 points, an equivalent of \$341 billion loss. Once the news was retracted, the loss was lessened to \$51 Billion (CHEQ, 2019).

Fake news applied to corporate context are undoubtedly emerging threats and notable cases are found in varied sectors. In a recent report from PricewaterhouseCoopers (Upton et al., 2020), the authors mention the use of disinformation to damage the reputation of companies and executives and even to promote a loss of social and customer trust, among other cases. Still according to the report, disinformation is becoming a commercial service as campaigns are

becoming easier to operate, more customizable, and new methods are created to evade content moderation tools.

In response to the generalized increase of fake news, diverse approaches are being explored as attempts to decrease its spread and effects mostly through regulations and policies. Researchers, scholars, political and business leaders have started to study the phenomenon and propose solutions to address diverse aspects of the problem. Since the 2016 US presidential election, social media companies have also been under rising pressure to actively try to stop the proliferation of fake news on their environments.

According to new research, (Edelman Trust Barometer, 2020), 64% of consumers worldwide expected brands to take an active stance and help to solve societal problems, under the risk of switching, avoiding, or boycotting. Yet, an even higher amount of 72% also believed that “companies should stop advertising with any media platform that fails to prevent the spread of fake news and false information”.

Recently, a coalition composed by organizations that fight against racism and violence towards black people, sexism, misinformation, and hate called advertisers on Facebook to pause ad spending on their platforms, demanding actions from Facebook to address such problems, as to stop generating ad revenues from misinformation and harmful content. Amid adoption of global companies such as Adidas, Coca-Cola, Microsoft, Unilever, and more than 500 other companies, Facebook’s shares dropped than 8% (Bloomberg – Dato, 2020), wiping out 56 billion dollars of market value.

Technology companies as YouTube and Facebook have been applying anti-fake-news strategies that seem as if they would be effective (Pennycook, 2020). In 2019, Facebook announced the implementation of a collaborative strategy with third-party fact checkers that would help to identify ‘false news’ on the platform. However, the company was exempting political ads from its fact-checking process, arguing that the public should be able to see, and vet, what political leaders say, regardless of its veracity.

Although companies are presenting a slight progress in the battle against misinformation (Imgram, 2019), research has shown that many of the employed tactics might turn out as ineffective, since some of them lack empiric evidence, while failing to identify the truth or even worsening the impact of fake news, leading to more confusion and uncertainty (BBC News, 2020).

The use of a scientific approach to tackle such a complex problem at scale demands time, resources, and effort combined. While Facebook is investing financial resources and working with academics and scholars on supporting research over misinformation and polarization (Lyons, 2019), the company is constantly faced with social and political pressures to provide timely responses.

Regarding the governmental sphere, legal scholars have proposed social solutions as increasing the media literacy of citizens or incentivizing trustworthy news sources (Waldman, 2018). But those approaches also require time and cannot reach everyone. Given those obstacles, other researchers have proposed legal interventions, regulatory or coercive actions from governments such as fining, taxing and imprisoning, to tackle fake news proliferation.

However, specialists also argue that ‘fake news’ would be categorized as public discourse, thus falling short for constitutional free speech principles in most of the democratic countries (e.g. the First Amendment law in the United States), regardless of its accuracy (Yale - Fighting Fake News Workshop, 2018). Yet, to some extent, that would depend on the interpretation of laws in each country.

In Brazil, a proposition of public law PL 2.630/2020 (Senado Federal, 2020) was elaborated to impose significant barriers for the creation and proliferation of ‘fake news’. Among its main actions, the text imposes social medias and messaging apps to store potentially viral messages, exclude automated user accounts and harming content, and disclose paid content or ads from non-paid ones, as well as the advertiser account. Additionally, the Congress representatives, who intend to classify the acts of financing, creating, or spreading ‘fake news’ a criminal activity, will also need to create a code of conduct for the use of social networks.

Thus, considering the detrimental consequences generated by disinformation in society and the diverse range of attempts to remediate their implications, it is valuable to understand how fake news spread. Particularly for Brazil, considering the pervasive expansion of disinformation and its influence in nationwide events, this research aims answer the following question: RQ 1: “How Fake News spread in Brazil during the Presidential Elections of 2018?”.

To answer the question, this study mapped the main sources of disinformation and distribution platforms where fake news circulated, providing parameters to dimension and explain its spread based on the theoretical knowledge from foundational research.

Despite the extension of research related to fake news, a great portion is dedicated to in-depth analysis in a single platform (Rogers, 2017) and to establish causational relations among particular cognitive or external factors that influence sharing or believing in fake news.

Thus, this study aims to contribute to the existing literature by exploring the spread of fake news in a multiplatform perspective, often referencing to cognitive factors and externalities as compounding factors. For such, the particular case of the presidential elections of 2018 in Brazil is explored.

The research is organized as follows: Chapter II reviews the literature on the definitions of fake news; the role of social media as distribution platforms; and the cognitive and external factors related to belief in fake news. Chapter III explores the factors behind the spread of fake news. Chapter IV is dedicated to explaining the methodology adopted to understand the phenomenon under a case study perspective. Chapter V provides a political and social contextualization of the presidential elections of 2018. Chapter VI presents the results and discussion about the main sources responsible to spread fake news during the presidential elections. Chapter VII presents the results and discussion about the *unique fake news stories* identified by the five fact-checking organizations. Chapter VIII gives an overview of the findings and presents the concluding remarks.

2. Literature Review

2.1. What is 'Fake News'

A necessary step to understand the spread and implications of fake news is to first know what it is and how is it different from *real* news. Regardless of its type, news is normally seen a product of journalism, expected by many to provide “independent, reliable, accurate, and comprehensive information” to citizens with the information they need to be free and self-governing (Kovach & Resenstiel 2007).

However, news is also subject to the writer's preferences and external stakeholders (e.g. audiences, advertisers, regulators) ultimately affecting what is included or not (Shoemaker & Reese 2013). Ultimately, it means that journalists can create the news, but it does not mean they are fake (Schudson 1989). In other words, it is important to understand that the term “fake news” is an oxymoron (Tandoc et al., 2018) since news are referring to an accurate representation of a real event, reported by accredited journalists (Kershner 2005). The expression is not only used in the academic context, but largely employed by individuals and the media in daily discussions, “invoked not only in efforts to point out false information but also in efforts to demonize traditional news organizations.” (Tandoc et al., 2018).

Different authors have identified the weaponization of the term “fake news” (McNair (2018), arguing that the current information ecosystem facilitates the deliberate use of the phrase to fulfill distinct purposes and political agendas. More specifically, Wardle and Derakhshan (2017) argue that the oxymoron has been appropriated by politicians around the world to refer to news organizations whose coverage they find disagreeable.

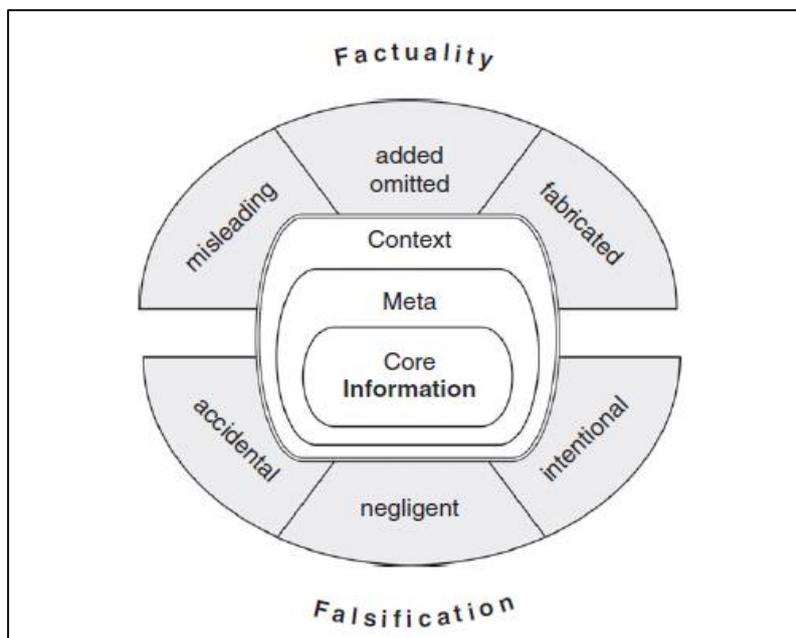
Traditional media channels are not isolated targets. Research has suggested that the discourse of fake news also affects institutions. In the political context, Farhall et al. 2019 shows that “political elites’ adopt the phrase “fake news”, negatively affecting individuals trust in news media. This has fundamental implications to the plurality of perspectives, general media trust, the discussion and classification of dis- or misinformation and for the whole existence of democracies, which depends on a well-informed population (Brummette et al. 2018). Thus, delimiting the term “fake news” is not only of literal importance but also has significant social implications.

The classification of the term is an ongoing discussion, but several authors situate fake news within the larger concept of misinformation or disinformation (Wardle 2017). While the later comprises the “inadvertent sharing of false information”, disinformation could be

understood the “deliberate creation and sharing of information known to be false” (Wardle 2017). When fake news is conceptualized as media content, they can take different “forms of wrong, misguided, or fabricated news along several dimensions and aspects of the transmitted information” (Quandt et al., 2019). They often simulate professional news standards by adopting the adequate formats and language but differ from them in terms of actual content or context (Lazer et al., 2018).

Extracted from Quandt, 2019, the figure 1 provides a clear systematization on the differentiation of fake news. The core content of the information can be presented in text, imagery, audio elements, etc. Accompanying meta-information are the headlines or titles, author information, tags, and keywords. Lastly, the contextual aspects are such as positioning, framing, and references to other content. All those mentioned elements can have different degrees of factuality and falsification, from (i) misleading (but factually accurate); to (ii) added or omitted information (inaccurate report of facts, deletion, omission, or enrichment of information); to (iii) entire fabrications without any factual basis.

Figure 1
A Systematization of Fake News



Note. Source: Quandt (2019).

Different combinations of elements are possible. A malicious individual or institutional actor may create a hard-to-detect disinformation article, for instance, by taking an actual event, enriching the report by inserting misleading information about one or more actors, and publishing the content with partially false information, seemingly as a part of news reporting

via media platforms. Considering the intent of mislead the reader, full fabrications are less interesting to malicious actors, since they are simpler and easier to detect. Indeed, the potential for harm relies on fake news coined with subtle deviations from the factual information cores, which would require a more accurate interpretation and analysis of facts.

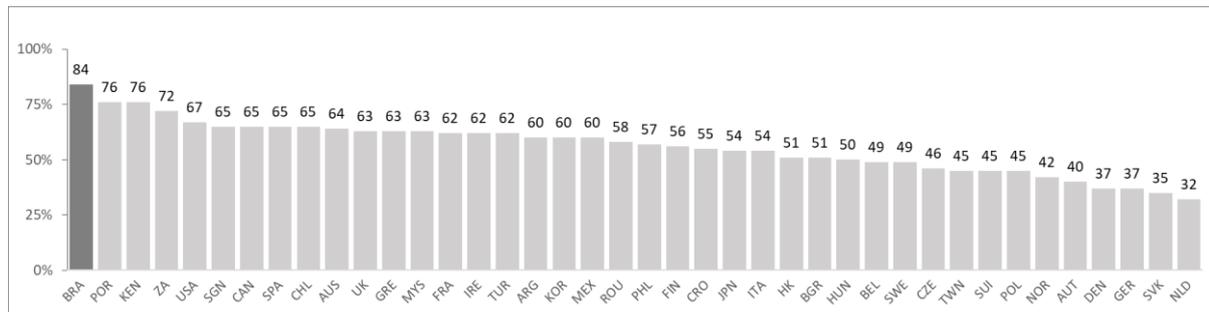
In short, behind the craft of fake news there is a deliberate intention to mislead, deceive and publish incorrect information while asserting it to be accurate news in order to gain a political or economic advantage (Garrett, 2011; Allcott & Gentzkow, 2017). Thus, minor mistakes, fruit of inadvertent or careless work, are different from deliberately misleading reports and are not considered disinformation.

2.2. Social Media Platforms and Information Filters

Information quality and truthiness is a concern to 76% of people around the world (Edelman Trust Barometer, 2020), and the global access to digital information via social media platforms has never been higher – 63% of the world population are active users (Reuters Institute Digital News Report, 2020). On top of that, the ease of producing knowledge and digital content on these platforms has significantly reduced the information distributions costs while rising its reach (Messing and Westwood, 2014), leading to unparalleled levels of access to information (Flaxman, Goel & Rao, 2016). Even so, people are still susceptible to fake news and other forms of strategic misinformation. Despite the lack of research consensus on explaining why individuals fall prey to fake news, much of the debate gravitates among our cognitive abilities and how do we receive, process, and share information in social media platforms.

Figure 2

Concernment with what is real and what is fake regarding news on the internet.



Note. Proportion concerned about what is real and what is fake regarding news on the internet. Source: Reuters Institute, 2020. Elaborated by the author.

The general adoption of social media as a communicational platform allowed the rise of new informational channels, shaping news consumption behaviors and strengthening interpersonal communication (Chadwick, 2013), while also shifting how information is accessed. Such dynamics have apparently given individuals more autonomy to select and control what content to read and see in their newsfeed and timelines. But one important implication related to the rapid rise of online platforms is information overload (O'Reilly, 1980), when users are exposed to more information than they can evaluate systematically. Under those circumstances, people have shown to rely on heuristics – mental shortcuts to make judgements and decisions – in an attempt to efficiently select what information is accurate and worth of attention (Tversky & Kahneman, 1974). However, in a context where people are gradually consuming more political news through social network in order to stay informed (Gottfried and Shearer, 2016), the use of heuristics can lead to suboptimal decision-making regarding the accuracy of the presented information.

Indeed, social media has displayed a crucial role in the dissemination of news as traditional news outlets have also adapted to this shift in consumption preferences by publishing and distributing online content to reach a broader audience (Messing, 2014). However, because of its format, social media has also allowed the rapid spread of disinformation to many users as they often attract web traffic and drive engagement to fake news websites (Starbird, 2014; Howard, 2018). A recent study indicated that a staggering 40% of fake news is consumed through social media platforms, while only 10% of real news is consumed in the same way (Allcott, & Gentzkow, 2017).

While social media platforms ideally foster the creation of decentralized, fragmented, and autonomous networks (Chadwick, 2013), individuals do not have complete autonomy to choose what they view on social media platforms. Instead, due to the large amount of

information they are exposed, platforms are likely to foster selective exposure behavior, as they are designed to facilitate consumers' ability to access information selectively (Iyengar and Hahn, 2009). The aim of algorithms responsible to drive such customized and personalized experience is to provide people with "information they are likely to desire and consume, by making some items easier to access, resulting in a personalized stream of content - that fails to offer - users a diverse set of alternatives to choose from" (Rader and Gray, 2015).

Motivated to keep the users engaged and create attractive advertising environments, those platforms tend to funnel the information to ideologically separated audiences (Maddow, 2010) or, more specifically, to targeted individuals (Scheufele & Nisbet, 2002). However, such dynamics contribute to place users in "filter bubbles" (Pariser, 2011) where they tend to only be presented to content that matches their preexisting beliefs and consumption behaviors and cultivate environments and connections that reinforce users' own biases and could be fertile grounds for polarization.

With effect, these bubbles contribute with the formation of "echo chambers", a widely studied phenomenon that occurs when people with similar interests and worldview interact primarily within their group, seeking and sharing information that both conforms to the norms of their group and tends to reinforce or exacerbate their beliefs (Jamieson & Cappella, 2008; Sunstein, 2009).

In fact, one of the most clarifying studies on the effects of algorithmic curation on social networking services analyzed the influence of user-driven, system-driven, and aggregated customizability technology on the user experience and found empirical evidence that they increased ideologically driven selective exposure and, thus, the likelihood of filter bubbles and echo chambers (Dylko, 2017). Even in a study funded by Facebook in 2015, it was mentioned that the platform's newsfeed algorithm might favor posts that support users' ideological viewpoints (Bakshy, 2015) and thus, exacerbate the "echo chamber" phenomenon. Beyond that, the research also showed that Facebook friend networks are ideologically segregated. Among friendships between people in the U.S. who report ideological affiliations in their social profiles, the median share of friends with the opposite ideology is merely 18 percent for conservatives and 20 percent for liberals.

Still, the influence of systems on users' experience could also reduce cognitive bias. A research conducted after the 2016 US presidential elections explored the design of political discourse and the implications of interacting with ideologically cross-cutting information. It

was found that modifying the systems in order to facilitate ideologically diverse dialogues was beneficial to political knowledge and increased constructive interactions, suggesting that “just as technology can inadvertently exacerbate the “echo chamber” phenomenon, a redesign has the potential to alleviate it” (Chambre, 2017).

2.3. Susceptibility to Fake News

It is both personally and socially valuable when people are able to infer the true state of the world. Based on vast literature, possible explanations for the formation of echo chambers and our ability to distinguish between real and fake news may be found on the way people view and process information through their cognitive system (Fu, 2013).

The desire of seeking information and interpreting evidence in ways that match our prior beliefs and expectations is a phenomenon which researchers call confirmation bias (Nickerson 1998) - driven by the fundamental nature of our cognition processes (Kahneman 2011). It is also noteworthy to mention that such psychological phenomenon frequently occurs while individuals are partially, or entirely unaware of it.

2.3.1. Cognitive Bias and Analytic Thinking

Exploring the individual cognitive factors that mostly influenced people’s belief of political fake news, Pennycook and Rand (2017) investigated whether we use our reasoning abilities to convince ourselves that statements aligned with our ideology are true or do they allow us to effectively differentiate fake news from real ones, regardless of political ideology.

The first account implied that susceptibility to – or belief in - fake news was mostly driven by partisanship (Kahan, 2017; Van Bavel & Pereira, 2018) and supported by the effects of motivated reasoning, a cognitive phenomenon that explains our tendency to find or accept arguments in favor of conclusions we want to believe in with less scrutiny than that which we do not want to. This would lead, for instance, towards a biased belief in information that aligns with our partisanship, regardless of the actual veracity (Redlawsk, 2002).

However, by analyzing participants’ abilities to identify fake news headlines and their propensity to engage in analytical reasoning, Pennycook and Rand (2017) found consistent evidence that analytic thinking has a major role in how people judge the accuracy of fake news, whereas those who are more inclined to think analytically are less likely to perceive fake news as true. Additionally, this relationship held true, regardless of different political ideologies and was robust to controlling for age, gender and education. Thus, the researchers finally argue that

people fall prey for fake news mostly because they fail to think analytically, an effect that overrides the influence of prior beliefs and values. These findings are also supported by another study (Clayton et al., 2019) that analyzed participants' abilities to judge the accuracy of fake news from mainstream media outlets (e.g. CNN and Fox News). The study also concluded that belief in fake news is better explained by content and the exposure to ambiguous or false articles rather than partisanship or source cues, arguing that this happens because people tend to simply believe in information they read uncritically when they are exposed to it - even in fake news.

Unsurprisingly, most of the people use the social media for hedonic purposes as connecting with friends and seeking entertainment, rather than utilitarian purposes (Chauhanand Pillai 2013). Thus, it makes sense to infer that people tend to be less mindful in their actions, ultimately affecting how information is received, processed, and even shared (Moravec, Randall and Dennis 2018), supporting the prevalence of lack of reasoning. On top of that, additional research has shown that most social media users only pay attention to partial aspects of information in news articles – such as news headlines - while using the platforms (Schäfer, Sülflow and Müller, 2017). On Twitter, for instance, more than half the articles are shared without the user reading them (Gabiolkov et al., 2016).

Under a hedonic mindset, individuals are less likely to think critically consider information versus those under a utilitarian mindset, (Hirschman and Holbrook 1982). While navigating on social media, the user's intention is not to consciously determine what content is true or false, but to feel enjoyment and pleasure (Moravec, Randall and Dennis 2018). Therefore, users tend to avoid work tasks, activities that require significant cognitive effort or that do not bring enjoyment, such as a more analytical thinking or thoughtful information processing. Instead, they are more prone to engage with content that make them feel good, which tend to be articles and videos supporting their beliefs. Moreover, social media platforms are designed to encourage users to avidly scroll and impulsively engage with content that mix serious news media with emotionally engaging content where veracity or accuracy is not relevant, implying that platforms may drive users away from considering accuracy when read and sharing news (Epstein, 2018; Mosleh, 2019; Pennycook, 2019).

2.3.2. The Role of Externalities

Apart from the individual cognitive factors, recent studies have also explored the role of context-specific or environmental factors (Coviello, 2014; Ferrara & Yang, 2015; Grinberg,

2019; Kramer et al., 2015; Yaqub, 2020), and even interface elements of social media feeds (Hameleers et al., 2020; Shen et al., 2019; Avram, Micallef, Patil and Menczer, 2020) that ultimately affect the belief in, consumption and spread of fake news on social media (Moravec, Randall and Dennis, 2018).

Because of the streamlined and minimalistic appearances of social media platforms such as Facebook and Twitter, the sources of articles and videos are not always clearly visible (Schakmuth, 2018) and users in a hedonic mindset present low inclination to verify online information and understand its origin (Kim and Dennis 2018) or to engage in fact-checking activities (DiFonzo, 2010). Even so, results from recent studies (Dias, Pennycook & Rand, 2019) indicate that providing publisher information or source details of fake news articles' headlines does not necessarily increase accuracy to detect them. By themselves, those factors would already provide a solid breeding ground for fake news. But to make the matter even worse, there is significant evidence that shows that people often perceive news (or content that emulates the language and format of news) to be more credible than other types of online information (Flanagin and Metzger, 2007), mostly due to the use of heuristics while interpreting elements such as source (Iyengar and Hahn, 2009; Dou 2012), or website characteristics (Fogg et al., 2003).

Thus, the rapidly increasing volume of misinformation displayed on social media is toughening the challenge to separate truth from fiction in a variety of ways. Contrary to common belief, a prominent research (Vosoughi 2019) that analyzed more than 126,000 tweets spread by approximately 3 million people has shown that online fake news spread more rapidly and broadly than true news. Particularly, political news suffered this effect more than stories about disasters, terrorism or other topics. Additionally, it was also found that emotional stories – those that provoke anger, anxiety or disgust – are significantly more likely to be shared (Berger, 2011). Despite focusing their analysis on Twitter, these studies coincide with the findings of a research on fake news virality based on Facebook content, instead, where Silverman (2016) showed how viral fake news stories outperformed the real ones on Facebook during the US presidential campaign.

The viral spread and higher exposition to fake news – as they tend to spread faster than true content - also impact individuals' susceptibility and belief towards them. A variety of cognitive studies demonstrate that prior exposure to a statement increases the likelihood that participants will perceive it as accurate (Dechene, Stahl, Hansen, & Wanke, 2010; Fazio, Brashier, Payne, & Marsh, 2015; Polage, 2012). This “illusory truth effect” implies that

reception increases the ease of processing those statements – or processing fluency -, which is subsequently used heuristically to infer accuracy (Alter & Oppenheimer, 2009; Unkelbach, 2007; Wang, Brashier, Wing, Marsh, & Cabeza, 2016).

In a recent study, Pennycook (2017) found that even a single exposure to fake news headlines increases the subsequent perceptions of accuracy of it – that is, the illusory truth effect is also applicable to misinformation context. For a specific headline, the single exposure increased the perceived accuracy of one fake news article from 18.5% to 35.5%. Even though the magnitude of this effect is less pronounced while showing extremely implausible statements, it held true to non-absurd headlines.

Interestingly, the illusory effect was also evident even among news that were inconsistent with individuals stated political ideologies and the existence or not of prior knowledge, supporting a broad consensus that repetition influences accuracy through a low-level fluency heuristic (Alter & Oppenheimer, 2009; Unkelbach, 2007; Whittlesea, 1993) and is probably driven by automatic memory retrieval (Diana, Yonelinas, & Ranganath, 2007, 2007; Yonelinas and Jacoby, 2012). This observation complements previously stated results from Pennycook and Rand (2017a), indicating that analytic thinking overplays the effects of motivated reasoning.

2.4. How Fake News Spread

2.4.1. Social Endorsement Cues

The exposure to fake news not only unchains a reinforcing effect, as previously stated, but is also linked to its spread. While a great part of research in the field explores the role of environmental, emotional, and individual factors that influence fake news spread (Ferrara & Yang, 2015; Grinberg et al., 2019; Kramer et al., 2015; Yaqub et al., 2020), Avram et al. (2020) studied the influence of social engagement metrics on the spread of misinformation.

According to the research, social engagement metrics amplified people's susceptibility to low-credibility content by making it less likely that people would examine it and, moreover, increasing the likelihood to share or like it. To explain such findings, the researchers recalled the *complex contagion* phenom (Mønsted et al., 2017; Romero et al., 2011), which states that the probability of sharing a piece of information grows with the number of times one is exposed to it. Since social engagement metrics are proxies for multiple exposure events, they provide signals about the relevance and reliability of a specific content – helping to overcome people's initial skepticism and influencing their decisions to consume and share that information. Thus,

users would consider, for instance, an article with a high number of likes or shares to be attention worthy, since many independent sources have validated it. Supporting these findings, other studies have also shown how social endorsement cues influence credibility judgements (Sakamoto, 2010; Bond et al., 2017), suggesting that people often use them on two conditions: to make decisions under ambiguity (*informative social influence*) or to make decisions that conform to established social norms (*normative social influence*).

Differently from social validation accrued from a high-volume engagement, an endorsement from a celebrity – or someone in a position of trust - in social media may also provide instant credibility to a message. By exploring how social validation influence the credibility of misinformation on Instagram, a recent study (Mena et al., 2020) has found that the credibility of content may also be perceived from trusted endorsements – or the liking or sharing of content by a reputable or trustworthy source. This also resonates with the results of a distinct survey in the U.S. (*‘Who Shared It?’: How Americans Decide What News to Trust on Social Media*, 2017) that analyzed people’s perception of trust on simulated news articles published on Facebook. According to the study, trusting the sharer was even more impactful on the perceived news credibility than the original source of information. In other words, “whether readers trust the sharer, matters more than who produces the article – or even whether the article is produced by a real news organization or a fictional one.” Building on previous literature, this can also be explained by the notion of social validation and its connection with credibility judgements, as we tend to rely on heuristics to infer the credibility of online content in a way to reduce cognitive effort (Metzger, 2013).

2.4.2. Social Bots and Fake Accounts

However, relying on social engagement metrics to interpret an article or video as trustworthy could be misleading. It is widely proven that social media online information can be easily exploited to manipulate people’s opinions, due to fraudulent websites and the substantial volume of software-controlled pages or profiles, denominated social bots (Shao et al., O. Varol et al., 2017; Yan, 2020). These automated accounts can create or post content and interact among themselves or even with legitimate users via social network connections, imitating real people (Ferrara et al., 2017). This problem has evolved in such scale that social media platforms as Facebook and Twitter have been actively investigating and suspending hundreds of millions of automated accounts (Associated Press, 2019).

To understand the influence of social bots on Twitter, a recent study has analyzed thousands of posts on the social media platform during and following the 2016 U.S presidential campaign (Ferrara et al., 2017). The researchers found evidence that social bots have significantly contributed to the spread of viral fake news, prominently during early stages. However, while few automated accounts are responsible for large part of the traffic, “humans do most of the retweeting, and they retweet claims posted by bots as much as by other humans” (Ferrara et al., 2017). These findings are consistent with prior research (Vosoughi, 2018) that analyzed and compared the spread of true and false information on Twitter, indicating that despite robots accelerated the spread of news from both types in similar rates, the later were faster to spread because humans were more likely to share them.

In short, when people tend to trust their social contacts (Jagatic, 2007) and over rely on engagement metrics, they can be manipulated into spreading fake news content, specially from political context (Guess et al., 2018). Because of the platforms’ design, fake news can also be carefully tailored to target the most vulnerable users – who are more likely to fall for misinformation - through targeting, replies and mentions during early stages, and bots manipulate them to magnify the spread on echo chambers. For instance, a research (Grinberg et al., 2019) that analyzed the spread of fake news in Twitter during the aforementioned U.S. elections has found that engagement with these contents is extremely concentrated, identifying that a mere 0,1% of users accounted for 79,8% of shares from fake news sources, and 1% of them consumed 80% of the volume from fake news websites. According to the study, older and politically engaged users were exposed to a larger volume of fake news sources in their feed.

2.4.3. Who is More Vulnerable to Fake News?

In general, even though potentially everyone is susceptible to fake news, some are more vulnerable than others. By examining individual-level characteristics associated with sharing fake news in Facebook, Guess et al. (2019) found that, even though sharing this kind of content was a relatively rare activity among all political ideologies, conservatives – especially those identified as “very conservative” - were more likely to do it, in comparison to liberals and moderates – supporting the findings from Grinberg (2019). But more importantly, a strong age effect was found, regardless of partisanship or ideology, where users over 65 shared almost seven times as many potentially fake news as the youngest group. Still, the partisanship asymmetries on sharing were already expected according to the researchers, once conservatives were more likely to be exposed to fake news material, given the “overwhelming pro-Trump

orientation in both supply and consumption of fake news during that period” (Guess et al, 2019).

Interestingly, the pronounced independent role of age as a sharing predictor is also supported by a representative survey conducted by the Pew Research Centre (Mitchell et al., 2018), which has found that only one in five respondents aged over 50 could completely distinguish factual statements from opinions, compared to one in three respondents from ages 18 to 49.

Two potential explanations for this age-related effect rely on cognitive phenoms and digital media literacy (Guess et al., 2018). A first possibility, based on social and cognitive psychology, suggests an overall effect of aging on memory. Following this, the memory would deteriorate with aging, rendering older individuals more susceptible to the “illusory truth” effect (Pennycook, 2017) and additional effects related to availability heuristic and belief persistence – for instance, making it harder for an individual to correctly recall news sources. Supporting this rationale, a study conducted in the UK (Nielsen et al., 2018) tracked the web usage of 7,000 internet users and compared their ability to recall the sources of stories they had read within the past day. It was found that young adults are significantly more likely to correctly identify and attribute news brands than the older ones.

Nonetheless, a second explanation to the age effect, also based on solid literature (Schäffer, 2007; Neves and Amaro, 2012), implies that older users lack the necessary level of digital media literacy to accurately indicate the trustworthiness of news on social media. In a complex and high-choice digital environment, the importance of understanding and navigating on new social media technologies has already been stated (E. Hargittai, 2005). Digital literacy is much needed, not necessarily to accurately identify and distinguish fake news from real ones, but to read all presented content with a skeptical resilience, thus avoiding the use of mental shortcuts or heuristics (McDougall, Brites, Couto and Lucas (2019). For instance, low levels of digital literacy could be compounded by the likelihood to use social endorsements and engagement metrics as credibility cues, as mentioned before (Messing and Westwood, 2012).

Many are the potential cognitive factors and externalities that could influence on the susceptibility and the spread of fake news. For instance, for countries with different levels of digital literacy, the predisposition for believing in fake news could be higher for people in less developed countries. Another hypothetical situation could be related to distinct habits of consuming news, from which a higher adoption of social media platforms would imply in

higher exposure to fake news and consequently influence on an individual's susceptibility to fake news.

Therefore, this study focuses on understanding the spread of fake news in a particular setting: the Presidential Elections of 2018 in Brazil. For such, the main research question to be answered is "RQ1: How Fake News spread in Brazil during the Presidential Elections of 2018?", having this particular case in mind. Additionally, among the various elements that could be explored, this research focuses on mapping and analyzing the main sources of disinformation and the relevance of distinct social media as distribution platforms.

3. Methodology

Facing Fake News as an object of study is a challenging task for researchers, mostly on methodological aspects. Since its popularization following the 2016 U.S. Presidential Elections, researchers from all over the world have developed and applied varied approaches to define the phenomenon (Allcott and Gentzkow, 2017; Lazer et al., 2018; Shu et al., 2017; Vosoughi et al., 2018; Wardle, 2017; Quandt et al., 2019), elaborate and validate theories behind susceptibility towards it (Pennycook et al., 2019; Rand, 2019, Chambre, 2017; Van Bavel & Pereira, 2018, Clayton et al., 2019), virality or spreading factors (Vosoughi et al., 2018, Wu et al., 2015, Silverman, 2016; Ferrara & Yang, 2015), how it relates with social platforms (Dylko, 2017; Bashky, 2015; Guess et al., 2019), among other factors.

Because of the influence of political, technological, and social conjectures on the phenomenon, results and evidence obtained from surveys, experiments, and varied research in the U.S – a main ground of scientific literature - may not apply directly to the Brazilian context, despite being undoubtedly significant.

Furthermore, Fake News as an object of study is not static nor an entity, hence it has been explored under different aspects and multiple perspectives (Lazer et al., 2018) through which great part of the investigative experiences focused, as aforementioned, in one or few elements that compound the phenomenon, thus favouring a constructivist and non-deterministic approach (Stake, 1995).

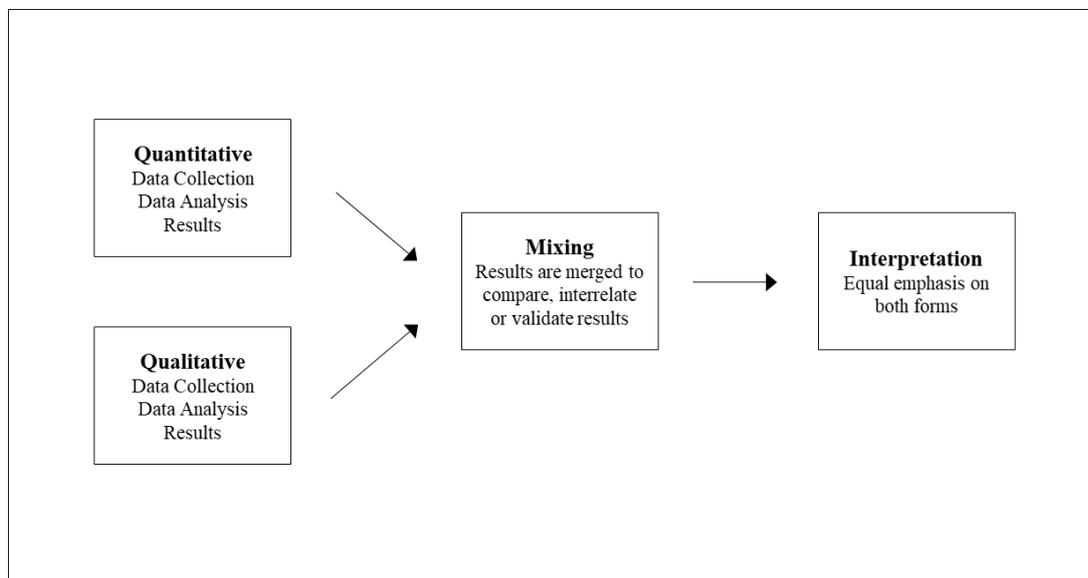
Based on this epistemological view and the foundational support of literature review, this research investigates the spread of fake news in Brazil, providing a possible interpretation of the phenomenon under the systemic view of the Presidential Elections campaign in 2018 – following similar research (Recuero & Gruzd, 2019; Dourado, 2020). For such, a case study method was chosen as it allows the investigator to retain the holistic and meaningful characteristics of contemporary events (Yin, 2002), while using from multiple sources of evidence to collect data.

Despite great portion of other research are focused on a single platform analysis (Rogers, 2017), the circulation of a fake news article is not restricted to a single platform, as the same content is often shared on more than one social media platform. Thus, because of the pervasive nature of Fake News (Venturini et al., 2018), instead of adopting a restrictive approach to a single source, this research applies multiple methods to collect and analyse data from different social platforms (Facebook, Twitter, WhatsApp), types of websites (mainstream

and partisan news outlets) and reports, leading to a more comprehensive representation of the fake news phenomenon.

The combination of quantitative and qualitative evidentiary sources is instrumental for the development of theoretical propositions guided by linking data through triangulation (Turner et al., 2015). Such design, illustrated in Figure 3, is a well-recognized form of mixed methods research (Creswell, Plano-Clark et al., 2003) and is used in this study to bring distinct but complementary types of data, comparing in parallel both quantitative and qualitative forms of evidence to provide context and better understand or expand results of each other.

Figure 3
Triangulation Design



Note. Source: Plano-Clark et al. (2008).

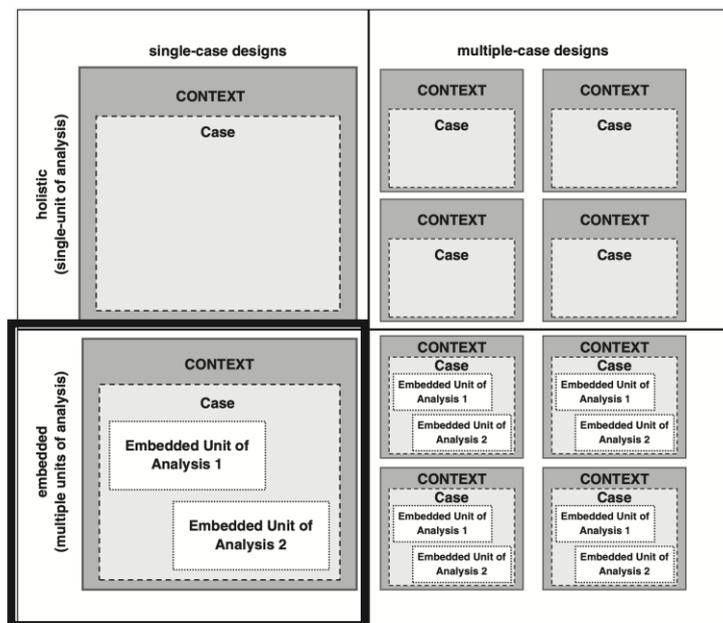
While distinct forms of evidence linking processes are applicable, holistic triangulation (Turner et al., 2015) is adopted in this research to fulfil the purpose of understanding the spread of fake news within the context of the Presidential Elections in Brazil. Indeed, such approach is suited for capturing a “more complete, holistic, and contextual portrayal of the unit under study” and enriching “our understanding by allowing for new or deeper dimensions to emerge” (Jick, 1979).

3.1. Case Study Design

Following the need for a combination of empirical data from multiple sources and the implications of exploring the fake news phenomenon through a unique event of the 2018 Brazilian presidential election campaign, this research also adopts an holistic single case design

under the contextualization of the phenomenon in Brazil (see Figure 4) as such choice is “advantageous when no logical subunits can be identified or when the relevant theory underlying the case study is itself of holistic nature” (Yin, 2004).

Figure 4
Basic Types of Design for Case Studies.

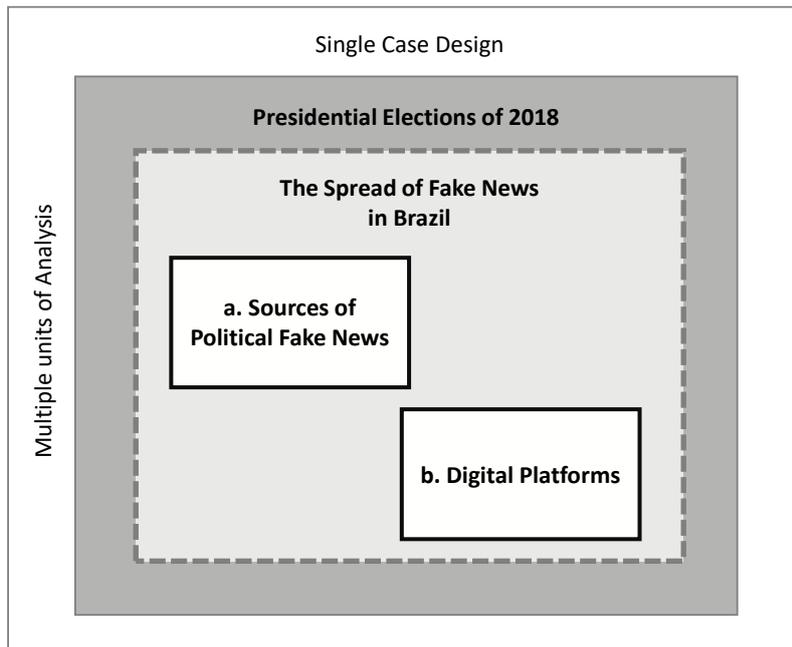


Note. Source: Yin (2004).

Perhaps more challenging is the attribution of units of analysis. Given the complexity of understanding Fake News as an object of study, multiple choices such of social and technological aspects can be explored (e.g. distribution platforms, main sources, actors, content and format, social mechanisms etc) – as they are in fact (Rogers et al., 2017), given the lack of a structured framework to approach the phenomenon as a whole. Therefore, it was adequate to follow a flexible design based on Merriam’s (1998) point of view where investigators need to review available research to conceptualize their inquiry and construct a theoretical analysis.

After an extensive examination of the inherent elements of Fake News – as presented in the literature review -, this study chose to explore two main units of analysis that are inherent to any fake news: a. Sources of Political Fake News; and b. Digital Platforms.

Figure 5
Single Case Design



Note. Adapted from Yin, 2004. Elaborated by the author.

The research design is based on mixed methods, where the combination of both quantitative and qualitative data collection, analysis and results is used to provide better understanding of the research questions than either approach by itself (Creswell et al., 2014).

Furthermore, digital methods are also combined in order to promote a better understanding of the complexity of digital objects in the perspective of Social Sciences (Bounegru; Venturini et al., 2018), presenting the advantages of theoretic confirmation and complementarity (Paranhos et al., 2016).

Considering Fake News as the object of study, the methods used to collect and analyse data are eminently digital, applied on a vast array of primary data from social platforms and secondary data available from scientific research and public data sets. Such approach is indicated for different types of online data (Rogers, 2017) as it supports the investigation of the complex and dynamic relations between the object of study and the means by which they occur – specifically, social media platforms.

The multiplicity of data formats and platforms in the digital environment induce the challenging task to identify, segregate and cluster texts, images, videos, audio files, links – all of which fake news spread through – especially for collection and analysis. Yet, the use of distinct metrics to adequate to each distribution platform brings additional complexity (Rogers,

2017). Thus, because of the distinct structural characteristics of each platform, data collected among them should be analysed accordingly, under the circumstances of not being directly comparable. In this sense, searching for fake news and analysing their content, format, reach and distribution and was an open process, decentralized and based on digital footprints for each article, post, image or video shared.

3.2. Data Collection

The collection of a database of fake news pieces in distinct platforms is a process that generally requires automated resources for scrapping online content and, for platforms such as WhatsApp, the constant monitoring groups during the desired event of analysis (Allcott and Gentzkow, 2017; Resende et al., 2019; Reis et al., 2020). Additionally, due to the mentioned implications of fake news during the 2018 presidential elections in Brazil, a considerable number of articles and accounts related to the dissemination of disinformation were already suspended or deleted by the social media companies (Stubbs, 2020). Hence, an appropriate method for investigating the event is to search for collected data sets that were made available to the general public.

This study uses a data set of fake news collected from Dourado (2020), a groundbreaking research on fake news during the elections in Brazil that analyses phenomenon focusing on content, format, and discourse of disinformation. Complementarily, studies and reports with different investigative approaches towards fake news in Brazil were also instrumental for the achieving the desired breadth of analysis (Machado & Konopacki, 2018; Resende et al.; Bursztyn; Ruedieger & Grassi, 2019; Reis et al., 2020).

Nonetheless, there is a considerable gap to be explored on the relation of the pervasive spread of fake news in Brazil in different platforms and the cognitive or external factors that promoted its continuation.

The data set of 346 unique pieces of political fake news collected by Dourado (2020) was compiled from five major fact-checking websites (Aos Fatos, Lupa, Fato ou Fake, Comprova e Boatos.org.) during the whole 2018 Presidential Campaigns between August and October 2018. It is noteworthy that all the selected fact-checking agencies are currently collaborating with the Superior Court of Justice, the highest instance of the Brazilian Judiciary, in order to jointly combat the spread of fake news ('TSE e Agências de Checagem Lançam Coalisão Contra Campanhas de Desinformação Nas Eleições, 2020'). Moreover, two out of the five agencies, Lupa and Aos Fatos, are certified by the International Fact-Checking Network

(IFCN) – an independent network of fact-checking organizations worldwide that investigate “statements by public figures, major institutions and other widely circulated claims of interest to society” (The Poynter Institute, 2017).

Generally, a methodological choice regarding the collection and classification of fake news has to be made to allow the compilation of a data set. These could be either by identifying publishing websites – such as extreme partisan websites - as fake news outlets (Lazer et al., 2018) or classifying the distributed content as disinformation. Hence, in the first, the attribution of “*fakeness*” is not at the level of the story but at that of the publisher. Yet, the last choice indicates a better methodological approach to the Brazilian context for an initial, once not all of the partisan news outlets distributed fake news, as verified by fact-checking organizations (Pires, 2020)

The methodological choice to use specialized fact-checking organizations as primary filters of fake news followed similar approaches adopted by foundational studies on the subject (Allcott and Gentzkow; Shao et al.; 2017; Aral; Roy; Vosoughi; 2018).

From the data set of 346 pieces of political fake news, two initial filters are applied: (1) only stories related to presidential elections are considered – since in Brazil, state elections are concomitant with the general elections (2) overlapping fake news stories – with slightly different versions - are considered just once. In this way, an initial sample of 332 fake news stories is obtained. Data from this sample is instrumental for mapping – through reverse search - and classifying the most relevant and accessed fake news websites responsible publishing disinformation at least once.

Following the analysis of the main sources of fake news, the sample is once again filtered in order to identify the most relevant stories that were spread on social media platforms during the period. For such, the classification criteria for selecting the fake news pieces were based on Dourado (2020), considering the following: false stories that (1) were checked by at least three out of the five fact-checking organizations and (2) shared at least 20 times (in multiple platforms).

For the elaboration of the second criteria, the “share volume” is not only relative to Facebook, as it might be thought, but also to interactions from Twitter as well. Following the suggested framework of analysis for multiple platforms from Rogers (2017), such qualification is applied to allow a common parameter of reach for fake news stories distributed in distinct social media vehicles. The number of times each fake news story was shared was collected by

Dourado (2020), that used Crowd Tangle (www.crowdtangle.com) - a browser extension that provides the digital traces and measures of engagement (e.g., likes, shares, comments, retweets) generated from shared content in social media platforms.

Table 1
Framework of Analysis for Multiple Platforms

	Facebook	Twitter
Query design	- Group(s) - Page(s)	- Hashtag - Keyword - Location - User
Platform user accounts (with primary actions)	User (friend, follow) Group (join) Page (like)	User (follow)
Content (media, contents and digital objects)	Post (text, video, photo, URL)	- Tweet (text, photo, video, hashtag, @mention, URL)
Resonance measures	- Like - Comment - Share	- Like (fav) - Retweet

Note. Adapted from Rogers (2017). Elaborated by the author.

In multiplatform analysis, the generally used element to allow the comparison of content that links two or more users (co-linked content) is a common URL (Rogers, 2017). However, for the collection and analysis of fake news stories, a URL as the bonding element would not suffice, since it would allow the overlap of same fake news stories distributed in distinct formats (e.g., text or audio messages, tweets, articles).

Hence, for this study, following Dourado (2020), the proposed bonding element of a fake news is the content, which may be presented in different formats, but counted just once for the same stories – as mentioned before. In summary, a *unique fake news story* may encompass one or more versions of articles, pictures, texts, or audio messages that have the same narrative and refers to the same story. Therefore, “share volume” is composed by the sum of (1) the number of retweets (Twitter) and (2) the number of shares (Facebook) for each *unique fake news story*.

Yet, particularly for messages in WhatsApp, it is not technically feasible to measure the “shared volume” of fake news since the platform is a closed environment and messages are restricted to public or private groups. However, it was possible to identify the cases in which WhatsApp served as a distribution platform for each of the fake news stories. For such, data

collected by the WhatsApp monitor (Resende et al., 2018; Reis et al., 2020) - an initiative that monitored 350 public groups in the platform – was used to identify the forwarded messages corresponding to each of the main fake news stories. This extensive analysis is made by Dourado (2020) and for each fake news story, WhatsApp, Twitter, or Facebook were presented as either relevant or not regarding the circulation of a *unique fake news story*.

3.3. Instruments for Data Analysis

Among vast categories of elements that could be explored within the phenomenon of fake news (e.g. content, format, malicious actors, virality etc), this study chose to analyse a. Sources of Political Fake News and b. Distribution Platforms, once they are protagonist elements for the spread of disinformation in any possible setting.

a. Sources of Political Fake News

In a first perspective, this study considered as sources of fake news the websites that were responsible for consistently spreading disinformation during the presidential elections. This first analysis is focused on answering the following questions: 1. “Who produces fake news?”; 2. “What are the most relevant sources of fake news?”; 3. “What are the main motivations for producing fake news?”; 4. “How relevant were these sources when compared to traditional news websites?”. Following Allcott (2019), a web traffic analysis was conducted as a possible way to infer the relevance of these particular websites over others.

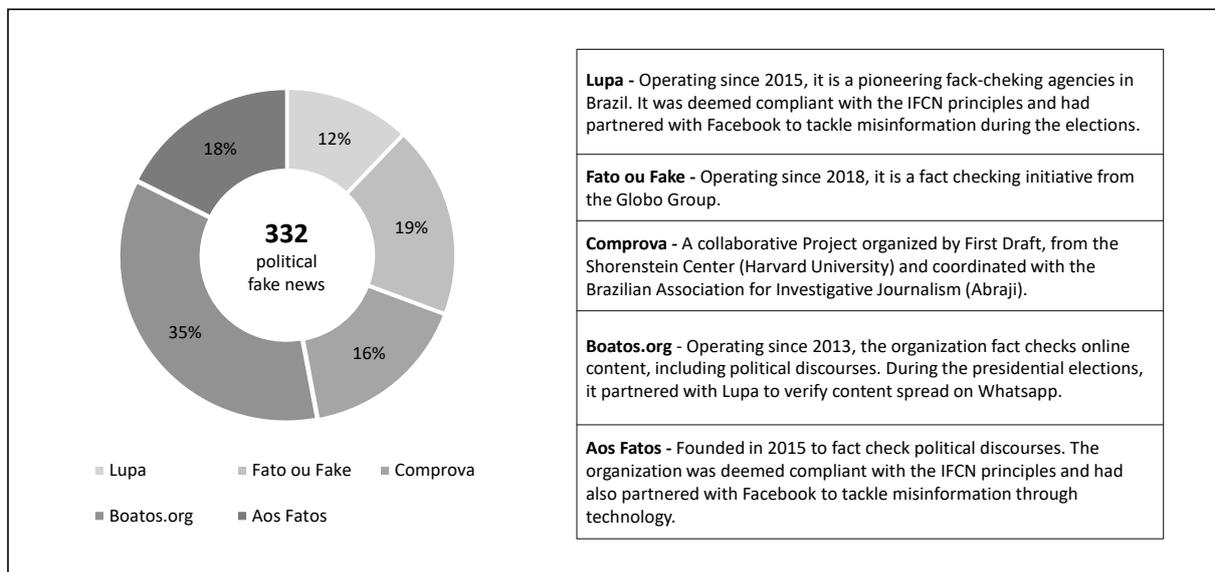
b. Distribution Platforms

As mentioned before, this study chose to include Facebook, Twitter, and WhatsApp on this analysis once they were cited in diverse research as prepondering platforms for the circulation of fake news. Here, it was investigated how they were used as distribution platforms for the main 58 fake news stories. To additionally gauge the relevance of open platforms, Facebook, and Twitter – open or partially open networks – were also compared in terms of engagement generated (number of shares). Data and results from reports were also used in order to understand how WhatsApp was also fundamental for the spread. This last analysis is focused on answering the following questions: 1. “How social media served as distribution platforms?”; 2. “What cognitive factors may have influenced the belief and willingness to share fake news?”; 3. “What externalities may have affected the vulnerability to fake news?”.

3.4. Sample Delimitation – Sources of Political Fake News

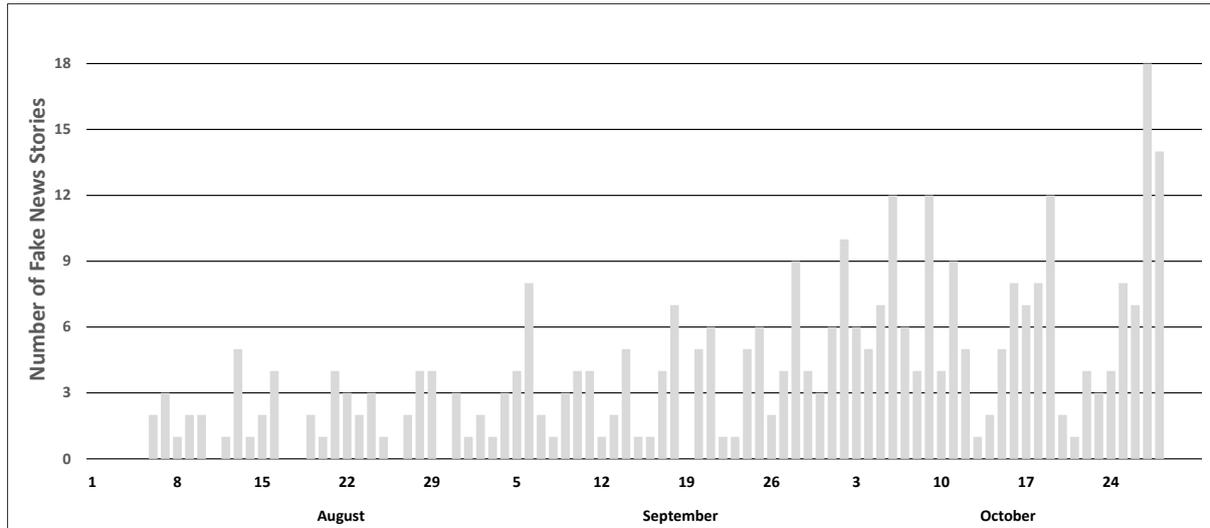
For the initial analysis of main fake news sources, the data set of 346 pieces was filtered by (1) stories related to the presidential elections and (2) *unique fake news stories*. The resulting sample is composed by 332 *unique fake news stories*, as shown in Figure 6 by fact-checking agency and in Figure 7 by chronological order. Additionally, following Dourado (2020), each fake news story was classified by political bias: “Pro-Bolsonaro”, “Anti-Bolsonaro”, “pro-Haddad/Lula”, “anti-Haddad/Lula”, and “other” as shown in table 2.

Figure 6
Coverage of debunked fake news
 (Per fact-checking agency)



Note. From August 01 to October 28, 2018. Elaborated by the author.

Figure 7
Circulated Fake News stories per day



Note. This figure shows the daily number of fake news that circulated during the presidential elections campaign. The dates for each fake news stories refer to when they were debunked by a fact-checking initiative. From August 01 to October 28, 2018. Elaborated by the author.

Table 2
Political bias in Fake News Stories

Political Bias	Number of Fake News stories	(%)
Pro-Bolsonaro	176	53
Anti-Haddad/Lula	62	19
Pro-Haddad/Lula	25	7
Anti-Bolsonaro	32	10
Other	37	11
Total	332	100

Note: this classification followed Dourado (2020). The field “Other” includes political bias related to other candidates for president during the elections of 2018. Pro/Anti: Alckmin, Amoedo, Alvaro, Daciolo, Ciro, Marina, Boulos, and others.

In this preliminary sample, we record 238 pro-Bolsonaro (or anti Haddad/Lula) and 57 pro-Haddad (or anti-Bolsonaro) *unique fake news* stories, showing that more of the fake news content listed by the five fact-checking initiatives is right-leaning. This could be because more of the actual fake news is right-leaning, or because more right-leaning content is forwarded to and/or reported by fact-checking organizations, or a combination of both (Allcott, 2017).

Yet, while it is not possible to determine the true amount of fake news shared or state a distinct cause for the preponderance right-leaning content, the intent of this study is not to extensively map all the disinformation from the period, but to understand the means that allowed the phenomenon to happen.

In spite of the already signaled spread of content in end-to-end encrypted platforms such as WhatsApp – where the source of a message is not trackable beyond the most recent sender -, different studies (Dourado, 2020; Resende et al., 2018; Evangelista, R., and Bruno F., 2019) indicate that a great part of potentially false information are first posted on the Web and then social media platforms and messaging apps. According to Resende's (2018) large-scale study of fake news on WhatsApp groups, 95% of the images with unchecked content were initially posted on the Web and then in the monitored WhatsApp groups.

Finally, despite limitations of scale and access to nationally representative data during the collection, the data set is likely to be a reasonable sample of the major fake news stories spread during the presidential elections period, since it is a compilation from diverse fact-checking initiatives that covered multiple platforms in national level.

3.5. Sample Delimitation – Social Media as Distribution Platforms

As the second step of analysis intends to gauge the importance of distribution platforms for the main fake news stories, the data set of 332 fake news stories was filtered once more. Similarly to Dourado (2020), the criteria were (1) stories fact-checked by at least three out of the five fact-checking agencies and (2) stories shared more than 500 times. This results in the final sample of 58 most relevant fake news stories.

4. Case Study – The Presidential Elections of 2018 in Brazil

This section firstly aims to provide a broad context of the 2018 presidential election campaign and present a panorama of economic, political, and social conditions at national level that likely contributed to the viral spread of fake news on social media in Brazil.

Furthermore, in order to answer the research question “RQ1: How Fake News spread in Brazil during the Presidential Elections of 2018?”, the study presents the analysis of “a. Main Sources of Political Fake News” and “b. Social Media as Distribution Platforms”, which are subsided by the mentioned data set and collected reports and guided by the lens of cognitive and external factors – from the literature review - that influenced the spread of disinformation during the presidential elections of 2018 in Brazil.

4.1. Case Introduction

Since 1995, the political scene in Brazil was generally dominated by the two largest parties that alternated turns on holding the presidency, the Workers’ Party (PT) and the Brazilian Social Democratic Party (PSDB). Both parties were ideologically moderate, with an extensive membership base and had a significant number of representatives in Congress.

Followed by a deep economic recession and an unprecedented political crisis that led hundreds of politicians to jail for corruption, the far from ordinary 2018 general election took place amidst great polarization. The economic and political conditions also accentuated the violence and feeling of insecurity - petty crime and homicide rates were at record high (IPEA, 2018). Altogether, those nationwide factors contributed to the fostering of a widespread rejection towards established political parties – especially the Workers’ Party, that had governed the country for most of the years from the last decade.

In the 2018 presidential elections, the traditional alternance of presidents between the two major parties was disrupted as the congressman and former Army Captain Jair Bolsonaro, a far-right politician regarded as a niche legislator for many years, was elected. Known for his extremist rhetoric, praise for the military dictatorship, and controversial statements during decades in the Congress, Bolsonaro was elected with 55 percent of votes (Fernandes, 2018). Such victory was later attributed by researchers and journalists not only to the political and economic conjectures from that time, but also to the massively effective use of social media platforms as primary means of reaching to voters (Amaral and Militão, 2018).

4.2. Economic Crisis, Outrage Against Corruption and Polarization

The sentiments occasioned by the economic stagnation (marked by peak unemployment rates and a shrinking economy) and political mistrust (fostered by the consequences of Car Wash corruption investigation) were two important surrounding conditions that led to the results of the presidential election (DFRLab, 2019). But on top of that, political debates in many spheres of society were ignited by the generalized spread of disinformation and political fake news in a hyperconnected and mobile enabled society (Reuters, 2018).

Preceding the elections, over half of the decade was marked by increasingly polarized debates. Mass protests and demonstrations in 2013, and furthermore, the narrow re-election of former president Dilma Rousseff sparked unprecedented divisions nationwide (Benites, 2014). For the following five years, Brazil was drowned into political and economic crisis and investigations culminated in the arrest of former president and major PT's representative Luiz Inacio Lula da Silva in early April, preventing his candidacy from the 2018 elections despite being a leader in the polls. These facts, magnified by the party's perceived inefficiency in addressing the country's economic issues (BBC News Brasil, 2018) led to significant rejection towards the PT (Davis, 2020).

In a contentious political race against Fernando Haddad, Lula's substitute, Bolsonaro was then presented as an outsider whose campaign proposed liberal economic policies, advocated in favour of easing gun rules, and performing heavy investments in security, and promising of undoing progressive policies implemented during the Workers' Party presidential administrations, which resonated with voters (BBC News Brasil, 2018b). Without Lula, Bolsonaro was ahead in the first-round polls from the start— with a lead that varied but was always above 20% of voting intentions.

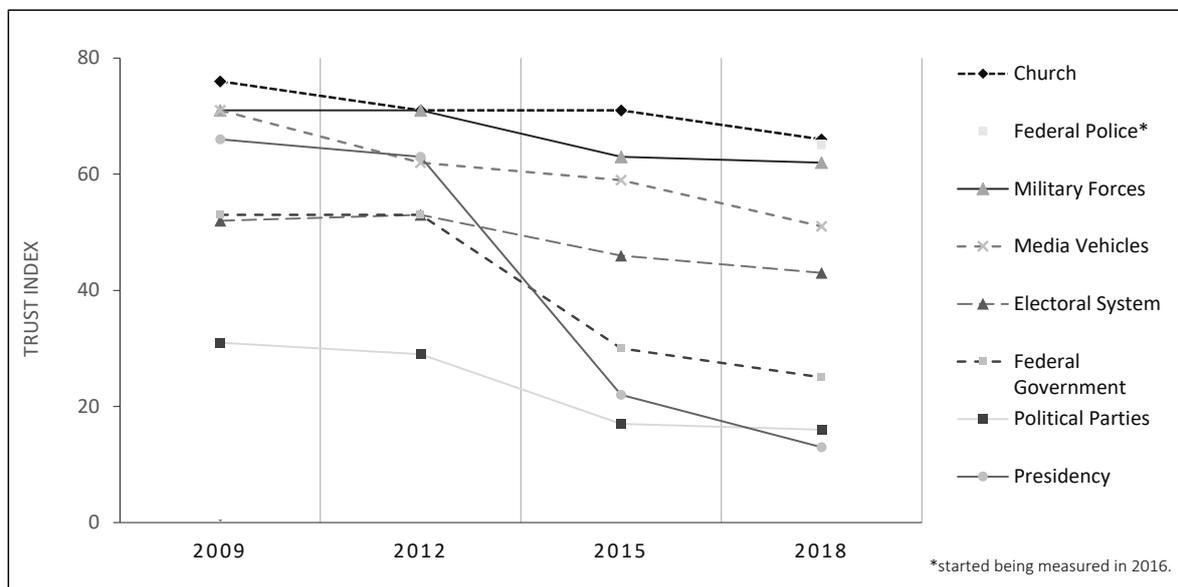
4.3. Distrust in Institutions

When compared to other candidates', despite being given less television and radio airtime – two components that had a major influence on presidential victories in the past – Bolsonaro's campaign was highly effective on using social media platforms to connect with voters in Brazil. In that year, general trust in institutions reached the lowest level in a decade (Ibope, 2018). However, there was significant disparity among the results for different institutions. While the presidency and political parties were the least trusted, others such as the church, the police and the military forces were some of the most trusted (Ibope, 2018). Thus, Bolsonaro's campaign messages resonated with a wide base of voters, reaching audiences on

social media and messaging platforms, vehicles that were increasingly adopted by Brazilians nationwide.

The historical high of distrust on institutions, merged with unparalleled levels of digital engagement (Reuters Institute, 2018) created a breeding ground for the massive proliferation of fake news regarding the elections, which spread in organic and hyper partisan forms (Ruediger, 2018). The declining trust in mainstream media and institutions, though, could be both a partial cause and a consequence of fake news gaining more traction (Allcott and Gentzkow, 2017).

Figure 8
Institutional Trust Index (ICS Instituições)



Note. Elaborated by the author. Source: Ibope, 2018.

4.4. Consumption of News in the Digital Age

The Brazilian media market is characterized by the presence of large commercial broadcasters and popular online portals and is highly concentrated both in terms of audience and ownership – four broadcasters dominate the market, capturing 70% of free-to-air television, the most popular media in the country (D.F.R.L., 2018). Although television still represents the preferred media outlet in the country, online media is a relevant source of news for 87% of Brazilians (Reuters, 2018). Additionally, in 2018, smartphones (77%) had already overtaken computers (55%) as the primary means of accessing online news.

Unsurprisingly, 120 million people – more than half of the country’s population of 210 million - already had access to internet, using it mainly to navigate on social media and

exchange messages. Notably, there were already 310 million active smartphones, representing almost 1.5 smartphones per person – despite penetration rates of approximately 65% (Mitchell et al., 2018). Social media played – and continues to play – a major role as means of accessing information. According to a survey from Datafolha Instituto de Pesquisas (2018), WhatsApp was used by approximately 66% of Brazilian voters for that purpose, followed by 58% from Facebook, 36% from Instagram and 14% from Twitter. In the first two platforms, Brazilians also showed disposition on participating of political groups. The Reuters Institute Report (2018) mapped that, among the publicly available groups for news and politics, the proportion of users that were members of at least one group was 22% from Facebook, and 18% from WhatsApp. Complementarily, the mentioned Datafolha survey also mapped that, among the voting population that had Facebook accounts, reading (45%) and sharing (21%) political news were common behaviours. On WhatsApp, the engagement showed for both reading (46%) and sharing (24%) was slightly higher.

Given the increasing relevance of social media platforms, investments on election campaigns from all major candidates were also directed to digital advertising. According to a survey conducted by Internet Lab (2018), the total disclosed spend in social media was 25 million reais for Federal Deputy candidates and 8.52 million reais for Presidency candidates. Besides being relatively less expensive, digital advertising represents an alternative to the limited television time attributed to candidates, and they are particularly attractive for small political organizations (Coding Rights, 2018).

However, an investigation from the news outlet (Mello, 2019) unearthed a coordinated campaign in which business supporters of Bolsonaro funded mass text messaging services against his political adversary, Haddad, and that service contracts would achieve amounts up to 12 million reais each. Additionally, Folha also showed that “businesspeople hired message blasts for and against candidates, without declaring these expenses to the Electoral Court, which constitutes a campaign finance crime”. WhatsApp also declared being against massive messaging and that it would take legal action against the tactics, banning accounts and sending cease-and-desist orders to the companies responsible (Isaac & Roose, 2018b).

In Brazil, besides Facebook and Twitter, WhatsApp was also largely used as a tool to reach voters all over the country, since the platform has astonishing national penetration (Netto, 2019). Particularly for the messaging app, its broad user adoption is also linked to zero-rating data policies, through which telecommunication operators can provide internet access to

customers without additional financial costs or provide them access to data from specific websites or applications that does not count toward their data cap (Galpaya, 2017).

A common practice for Telecom operators is to offer free use of WhatsApp data for pre-paid plans owners, which corresponded to 56% of total plans in 2018 (Teleco, 2019). Hence, even if a user does not have any credits left for accessing the internet, they can still send and receive media content on their WhatsApp groups and from individual users.

Unfortunately, while the widespread use of social media and applications may be instrumental to amplify and diversify the access and consumption of quality information, these platforms were also used by many to disseminate disinformation nationwide in the form of fake news. This becomes an even worse problem when users are unable to differentiate real from fake news or when they simply cannot afford fact-checking in news websites or other sources due to data limitations. According to a global survey ran by BBC (2017), 92% of Brazilians expressed concern about being able to discern between fact and falsehood online, representing the highest percentage of respondents in any country surveyed.

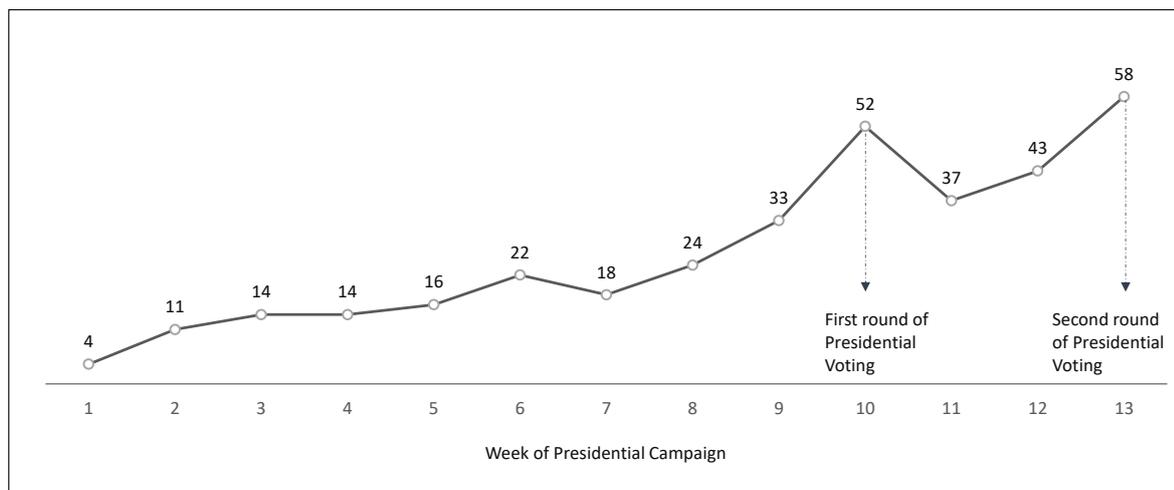
Representing a group that is particularly preoccupying, according to a study from the Wilson Center (2018), nearly one-third of Brazilians between fifteen and sixty-four years of age are “functionally illiterate”. This means that they struggle to read more than keywords in most written texts.

Similar to the country as a whole, illiterate Brazilians are overwhelmingly active on social media platforms, with 72% using Facebook and 86% in WhatsApp. Yet, this segment of the population seems particularly vulnerable to believing and spreading fake news, once images, videos, audio messages, and simple and brief texts are common on social media. Still according to the study, members of this group are also less likely to fact-check the information they consume, to spot embedded satire or irony, or to question unfounded and exaggerated claims and sources.

4.5. Fake News in the Presidential Elections of 2018

During the presidential campaigns in 2018, from the beginning of August to the end of October, 346 unique articles, images, messages, and posts were classified as fake news by “Aos Fatos”, “Boatos.org”, “Comprova”, “Fato ou Fake” and “Lupa”, fact checking organizations committed to deliver quality information to Brazilians. Among the disinformation that circulated through social media platforms and messaging apps, some had impressive reach and were possibly successful on casting doubts on readers and voters.

Figure 9
Debunked Fake News during the 2018 Presidential Elections
 (During each week)



Note. Data from the original sample of 346 fake news stories. Elaborated by the author.

According to a survey conducted by IDEIA Big Data/Avaaz (2018), 86 percent of voters were exposed to some fake news during the electoral period. Among candidate Bolsonaro’s voters, 98.2% of encountered one or more fake news and 89.8% of them believed on at least one false story. Still, according to the institute, 7 out of 10 Brazilians believed in at least one fake news during the period, which may suggest that the challenge on identifying falsehoods is not restricted to a specific public in Brazil.

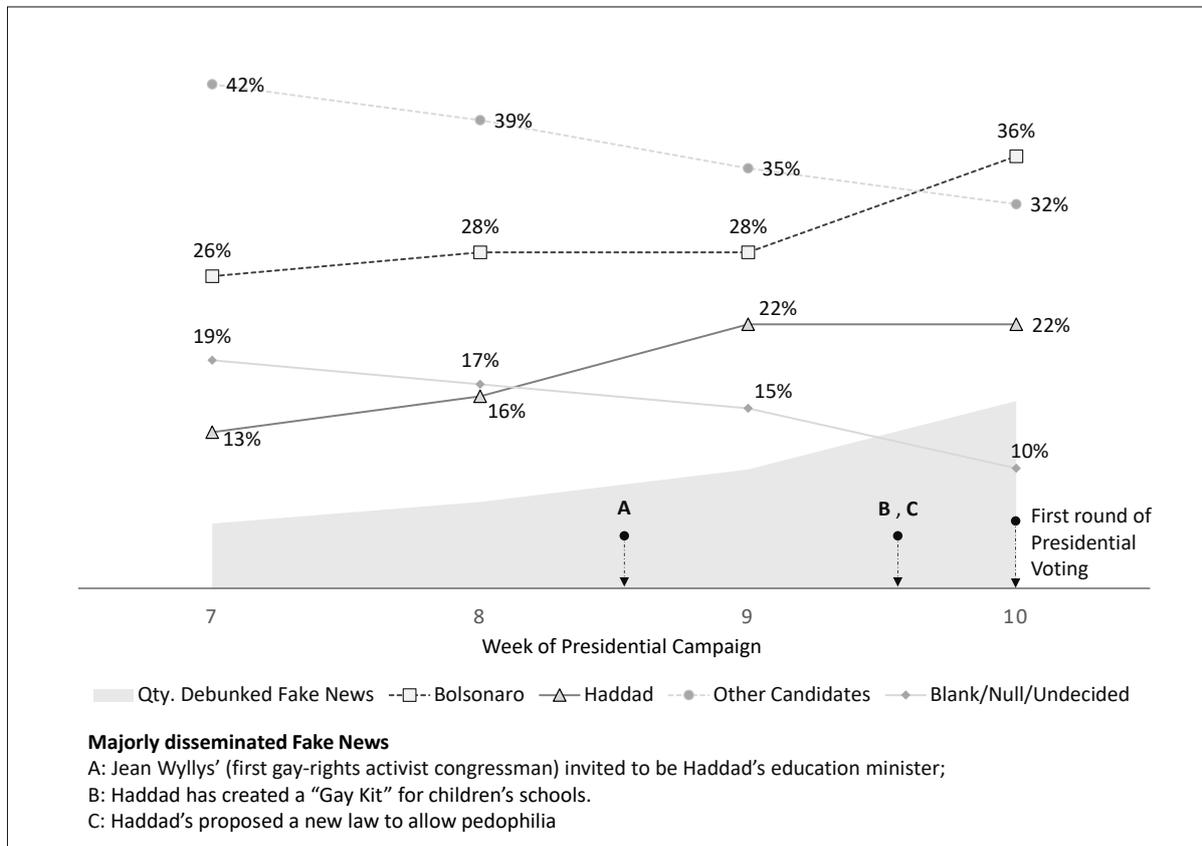
The wide reach of fake news in part can be attributed to the use of bots, but the high percentage of voters who believed and accepted the stories indicates that many Brazilians found it worth sharing (Wilson Center, 2019). For instance, one of the most widely distributed pieces of fake news, shared over 400 thousand times and believed by 84% of Bolsonaro’s voters, claimed that Haddad had created a “gay kit” for children’s school curriculum to encourage homosexuality. An even more widespread piece of disinformation, shared over 732 thousand times on social media platforms and believed by 74% of Bolsonaro’s voters, claimed that electronic ballot boxes were frauded to automatically compute votes to the Workers’ Party candidate Haddad. Reinforced by a tweet from the later elected senator and son of Jair Bolsonaro, Flávio Bolsonaro, this fake news was “able to reach 16 million people in 48 hours after the first election round”, reported Diego Casaes, campaign coordinator for Avaaz.

Over the whole presidential election campaign in 2018, fake news in favour – or against – nearly all candidates were continuously distributed in multiple social media platforms and applications. Notably, though, as the campaign headed to an election round, the volume of

disinformation would increase - as shown in the figures 10 and 11. Additionally, in an interview given to EL Pais (2018) days before the election, the director of the fact checking agency Aos Fatos reported “an increasing amounts of disinformation against Bolsonaro’s adversaries, generally regarding two themes: cast a doubt, through conspiracy theories, on the security of the electronic voting system in Brazil and a constant relation towards candidates who support minorities and themes such as LGBT and abortion” (Tai Nalon, 2018). Hence, although the impact of fake news on the electoral outcome is a continuous debate, disinformation had an unquestionably extensive reach and was able to mislead a considerable number of Brazilians.

Figure 10

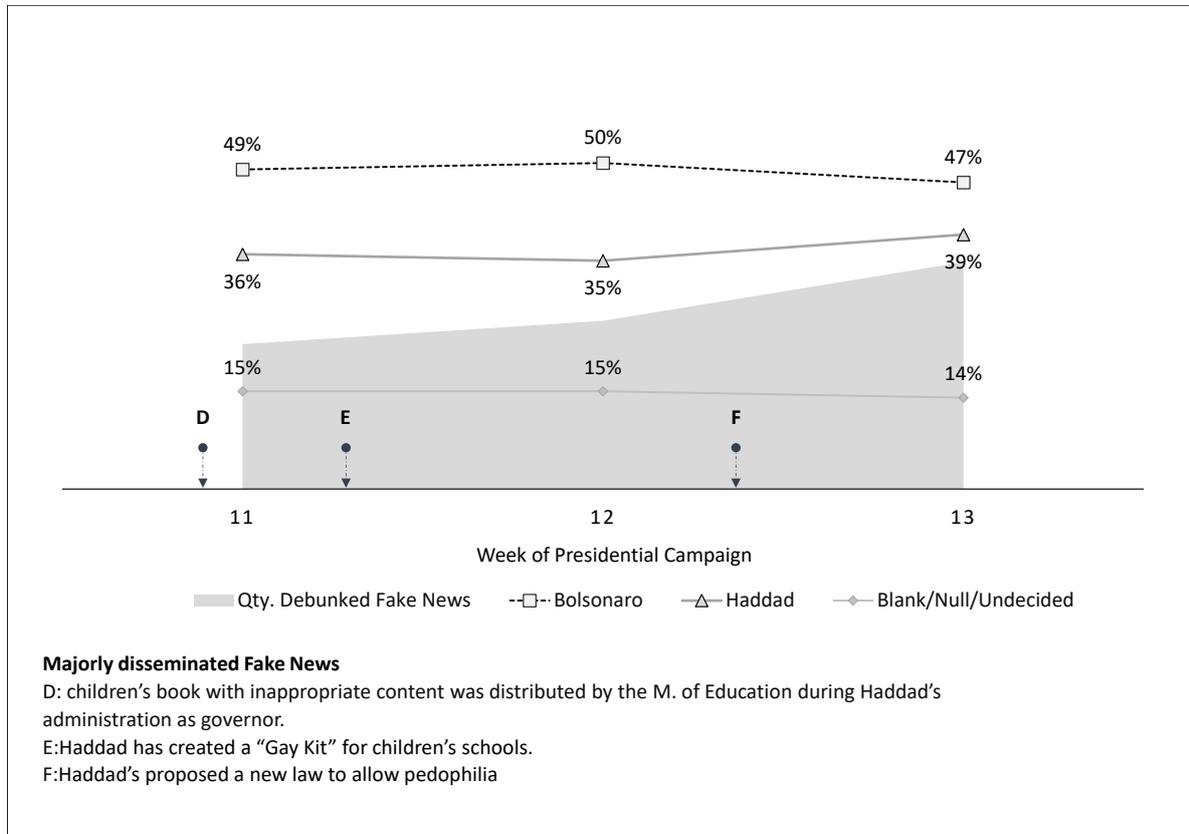
A. Voting Intentions during Fake News dissemination
(First Round of the Presidential Election)



Note. Ibope (2018), Datafolha (2018). Elaborated by the author.

Figure 11

B. Voting Intentions during Fake News dissemination (Second Round of the Presidential Election)



Note. Elaborated by the Author. Sources: Ibope (2018); Datafolha (2018).

5. Results and Discussion

5.1. Sources of Political Fake News

Fake news content often originates on distinct types of websites or media platforms and some of them became widely known for disseminating a vast amount during the presidential elections. For instance, a pro-Bolsonaro website - Terça Livre -, one of the most accessed fake news websites, recently had its YouTube channel suspended by Google due to “serious or repeated violations of YouTube’s guidelines in their communities” (Congresso em Foco, 2021). Apart from the main webpage tercalivre.com.br, the website has also used a Facebook profile used to spread dubious content.

Investigations into reports that surfaced following the 2018 presidential elections provide a possible view of actors behind sites such as Terça Livre. According to an analysis by UOL - a prominent digital news outlet - alongside the Superior Electoral Court (TSE), Bolsonaro’s party in 2018 had provided funding for expenses of Allan dos Santos, a blogger responsible for operating the website Terça Livre. According to the investigation, among these publicly declared expenses from the Social Liberal Party (PSL), were travel, education and leisure-related expenses. Still, according to David Nemer (2019), a researcher that had monitored pro-Bolsonaro WhatsApp groups since 2018, former Bolsonaro’s supporters from these groups would have received small amounts of money to produce and share fake news, in addition to recruiting more participants.

Following the presidential elections, a distinct investigation by the Fake News Joint Parliamentary Commission of Inquiry (CPMI) – set up to investigate cyberattacks that harm democracy and public debate – appointed that the federal government had promoted several advertisement campaigns on 47 fake news channels such as Terça Livre, financing more than 650,000 ad impressions through Google AdWords between June and July of 2019.

According to Allcott and Gentzkow (2017), there appear to be two main motivations for sustaining the supplying side of fake news. The first one is monetary: as disinformation tends to spread faster than real news (Vosoughi, 2018), website owners can profit from significant advertisement revenues when users click on their content. The second motivation is ideological. Some providers deliberately use fake news as an instrument to advance their candidate they favor or to harm the reputation of candidates who they oppose (Talwar et al., 2019).

Generally, websites that spread fake news have common patterns. They frequently lack editorial norms and processes for ensuring the accuracy and credibility of information (Lazer et al., 2019). From that point, distinct researchers have studied fake news and analysed veracity or falsity at the level of the publisher, as mentioned before. However, the data set used in this study is built from fake news articles that were classified by their content, once investigated by the independent fact-checking initiatives.

Therefore, in order to obtain a reasonable sample of the main websites that spread disinformation during the 2018 presidential elections, the data set of 332 previously classified fake news stories served as base for investigating the corresponding disinformation sources. When no sources were mentioned by the fact-checking agencies, advanced searchers were conducted on the web, using the fake news titles as reference. Essentially, the intention of such investigation is not to identify the origins distinct stories – once there are multiple platforms of distribution - but to map the relevant sources that have influenced their spread. Furthermore, the websites were classified by either being right-wing or left-wing, according to the fake news stories shared and previously analysed by fact-checking agencies.

Combining the aforementioned sources, 59 websites responsible for spreading fake news during the elections were found (see Appendix A). Unsurprisingly, 9 are no longer available – although it is still possible to collect their historical data. A distinguishing characteristic of a fake news website is perhaps the lack of intent to build a long-lasting reputation for quality, but rather capitalize on short-term strategies such as attracting clicks in an initial period (Allcott and Gentzkow, 2017). Notably, a significant amount of the listed websites lacked basic editorial standards, despite apparently trying to resemble legitimate news organizations by mimicking their format or choosing similar website names. For instance, the website *diariodobrasil.org* does not present any information regarding authors or sources - but it does have a link to its Facebook page. Another website, *F7noticias.com*, is presented in a way that perhaps resembles R7.com - the 5th most accessed online news outlet (Reuters Institute, 2019) – both in terms of name and format.

Even though that all the 59 websites were responsible for sharing fake news articles from the gathered data set, one website – “Diário do Centro do Mundo” – presents editorial standards (Dourado, 2020) and had only published one fake news article – which was later withdrawn. Despite its partisanship, the website is also amongst the most accessed news outlets in Brazil (Reuters Institute Report, 2019). Thus, for the purpose of understanding the relevance

of major fake news sources – which purposely produce or distribute deceiving content – the website is not considered for a more in-depth analysis.

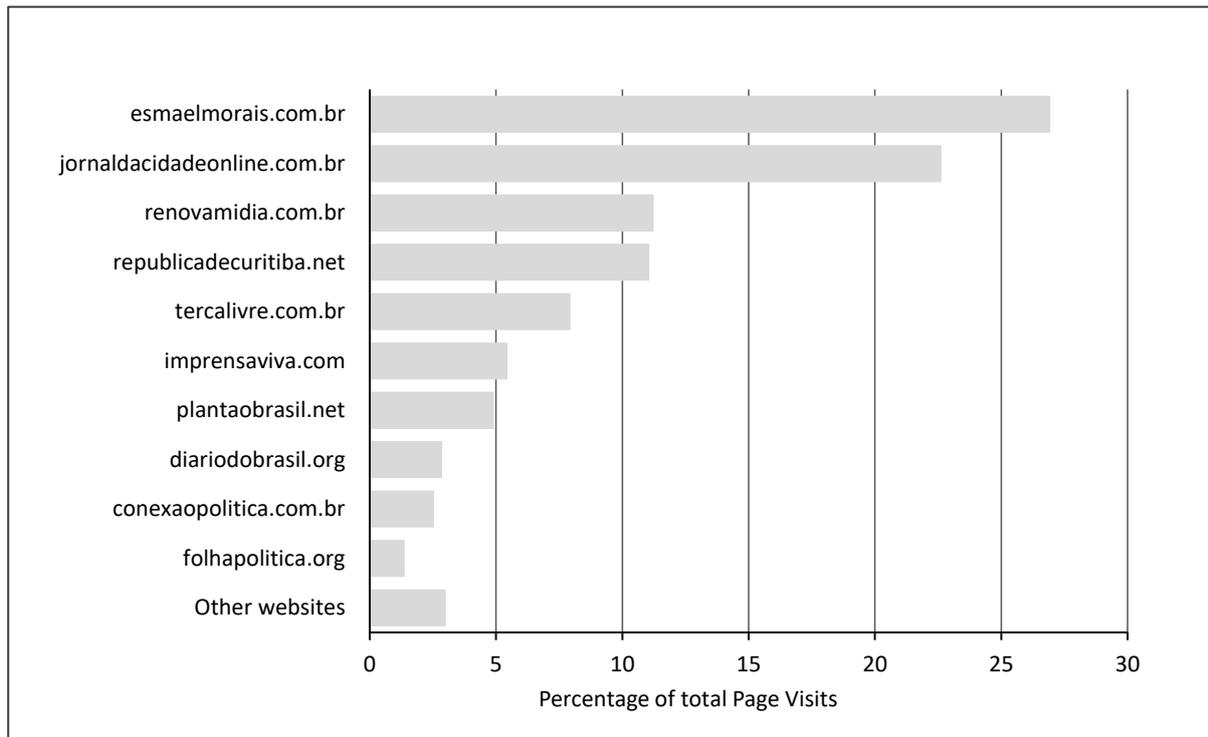
5.1.1 The Most Relevant Fake News Websites

Numerous studies engage on endeavors to infer the influence and relevance of fake news websites by assessing traffic sources (Fourney et al., 2017), user engagement (Chalkiadakis et al., 2020), content production (Sharma et al., 2019) and distribution (Grinberg et al., 2019), among other factors. Thus, a feasible way to measure the importance of multiple fake news websites considered in this study is to take a closer look at their historical web traffic. Following the methods of website traffic measurement adopted by previous studies (Allcott and Gentzkow, 2017), this study uses data from Alexa (alexa.com). Figure 12 presents the share of page views (or page impressions) among the 58 fake news sources during Brazil’s presidential election in 2018 (early August to late October).

Figure 12

Share of Page Views among main Fake News websites

(During the presidential election campaigns. From August 1 to October 31, 2018)



Note: This figure presents the percentages of pageviews per website among the 58 fake news sources during the presidential election campaign period. The percentages of daily pageviews for each website are weighted by the total number of pageviews in each day. Data are from Alexa (alexa.com). Multiple page views of the same page made by the same user on the same day are counted only once.

Each time a web page is visited (or a URL request is sent to a website), that “pageview hit” is computed by analytics tools such as Alexa or Google Analytics. To gather data, Alexa uses browser extensions and plug-ins installed on people’s computers. Furthermore, Alexa calculates the total number of pages viewed by all users on daily basis. From that universe, the percentage of daily page views is estimated for each website.

Firstly, it is important to clarify that not all the mapped fake news sources in Figure 12 are equal. For instance, esmaelmorais.com.br – the most relevant in terms page impressions – is a left-wing opinion-based blog that, despite presenting some editorial standards (e.g. information about the authors and writers), constantly lack factual basis and also publishes political fake news^{1 2}. On the other hand, outlets as republicadecuritiba.net, diariodobrasil.org and folhapolitica.org are right-leaning websites that show total absence of editorial standards and are consistent publishers of disinformation³. Hence, although all the listed sources were responsible for spreading one or more fake news story, they vary in terms of editorial standards, published content, and political stance.

Secondly, Figure 12 shows a high concentration of accesses related to a small number of websites. Within the universe of 58 fake news sources, the top 5 were responsible for 79.8% of the traffic. Even though a certain level of traffic concentration was expected, these results are remarkably high. For instance, the findings of previously mentioned studies (Lazer et al, 2017; Grinberg et al., 2019) on Twitter showed that 5% of fake news sources (from distinct categories) accounted for 50% of potential exposures to fake news and the top 7 websites accounted for more than 50% of exposures. Complementarily, the consistency of results is perhaps supported by the investigations from a large-scale study (Bursztyn, 2019) that monitored 232 partisan (left and right-wing) WhatsApp groups in Brazil and equally identified many of the websites in Figure 11 as relevant news sources for these groups. This means that the investigative efforts of fact-checking agencies could be efficiently allocated in monitoring the most accessed sources of fake news and proactively working to reduce the chances of unintentional exposure to disinformation and its consequences.

¹ Fake News article from Blog do Esmael: <https://www.esmaelmorais.com.br/2018/10/fhc-declara-apoio-a-haddad-no-2o-turno/>

² The same Fake News story, debunked by Agencia Lupa: <https://piaui.folha.uol.com.br/lupa/2018/10/27/verificamos-fhc-nao-declarou-apoio-fernando-haddad-no-2o-turno/>

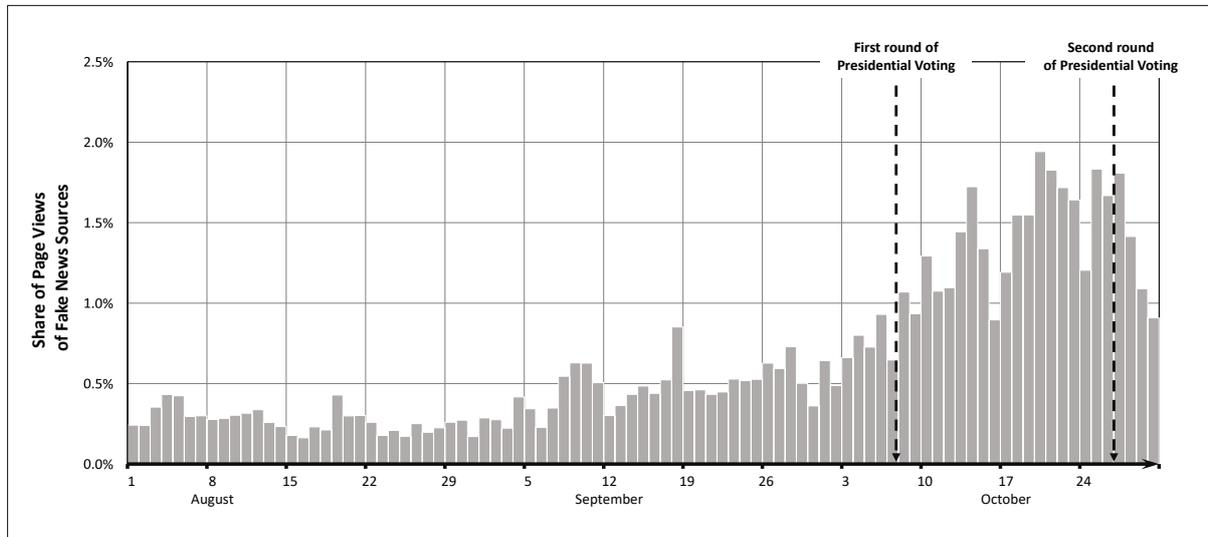
³ Article from Aos Fatos on how the website republicadecuritiba.net publishes fake news: <https://www.aosfatos.org/noticias/para-publicar-desinformacao-editor-do-republica-de-curitibanet-usa-foto-de-outra-pessoa-e-exibe-curriculo-falso/>

Thirdly, a prevalence of a political side can be observed in Figure 12, where 8 out of the top 10 sources are right-leaning and concentrate 68.2% of the traffic and only two (esmaelmorais and plantaobrasil) are from the opposing political field. When considered together, these results suggest that the generalized spread of disinformation was more expressive both in terms of supply (published stories) and demand (traffic volume websites) of fake news. If this is true, a possible external effect would be the higher exposition to ideologically right information and, consequently, the increase of perceived accuracy of such fake news due to the illusory truth effect (Alter & Oppenheimer, 2009; Unkelbach, 2007; Wang, Brashier, Wing, Marsh, & Cabeza, 2016), which may have benefited the far-right candidate for president Bolsonaro.

Although it is generally accepted that a large amount of fake news was widely spread during the presidential elections of 2018 in Brazil (Machado and Konopacki, 2018, Resende et al.; Bursztyn; Ruedieger and Grassi, 2019; Dourado; Reis et al., 2020), monitoring or measuring the total exposure of individuals to it is particularly challenging. A substantial part of it circulates on multiple platforms and includes a combination of types of media (e.g., image, text, audio, video), being presented in ways such as on news feeds or private messages. Still, one way to indicate the extent to which people were exposed to it is by measuring the web traffic of main fake news sources relative to the traffic of nationally relevant mainstream news outlets.

Figure 13

Page Views on Fake News websites relative to views from Top News websites in Brazil
(During the presidential election campaigns. From August 1 to October 31, 2018)



Note: This figure presents the percentage of daily pageviews of the main fake news sources relative to the total daily page views from top news websites. The fake news sources are segmented by political orientation (right or left-wing). Data are from Alexa (alexa.com).

Figure 13 shows the share of page views from the mapped fake news sources in relation to the total page views from the top 15 most accessed news sources in Brazil, ranked by the 2018 Reuters Digital News Report.

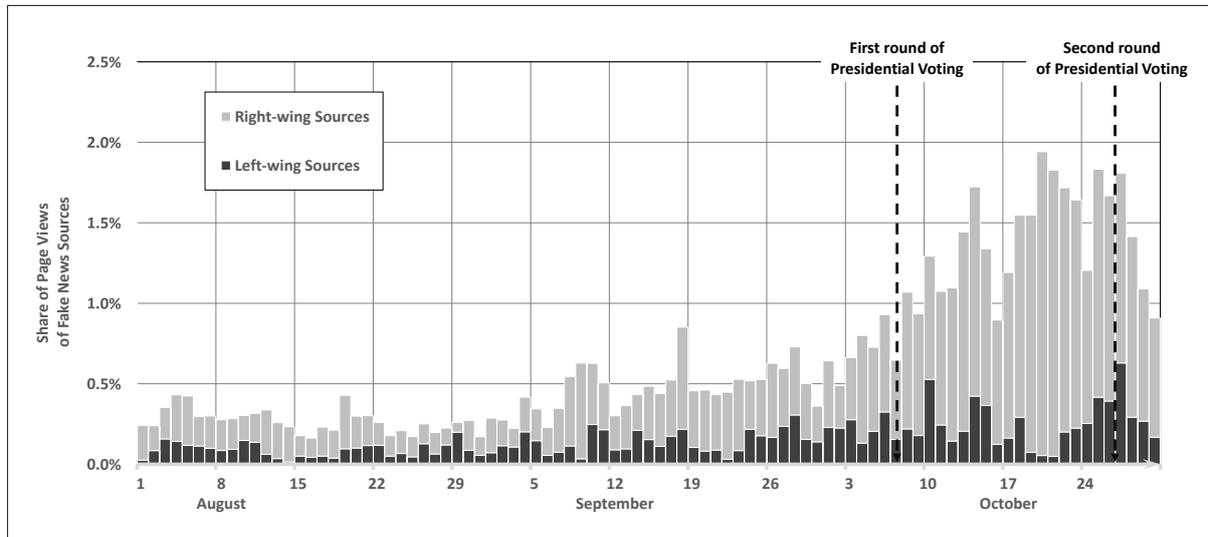
The results indicate that, despite the visible increase of traffic related to fake news sources, when put in perspective, the relative volume of impressions reveals that fake news is not as pervasive as one might have thought. From the beginning to the end of the presidential election campaigns, the page views of considered fake news websites altogether have not surpassed 2.0% of the total page views from the top mainstream news outlets, suggesting that the implications from the exposure to disinformation might have been limited. Alternatively, it could also mean that a greater part of the circulation of fake news happened in closed platforms such as WhatsApp, which hinders the ways to measure exposure.

Notwithstanding, the relative traffic to these fake news outlets spiked a few days before the first round of voting and almost tripled before the second round, indicating the explosive increase of relevance of these outlets in relation to traditional media. This outburst, however, might have had an unbalanced influence on electoral charts.

Figure 14

Page Views on Fake News websites segmented by political orientation

(During the presidential election campaigns. From August 1 to October 31, 2018)

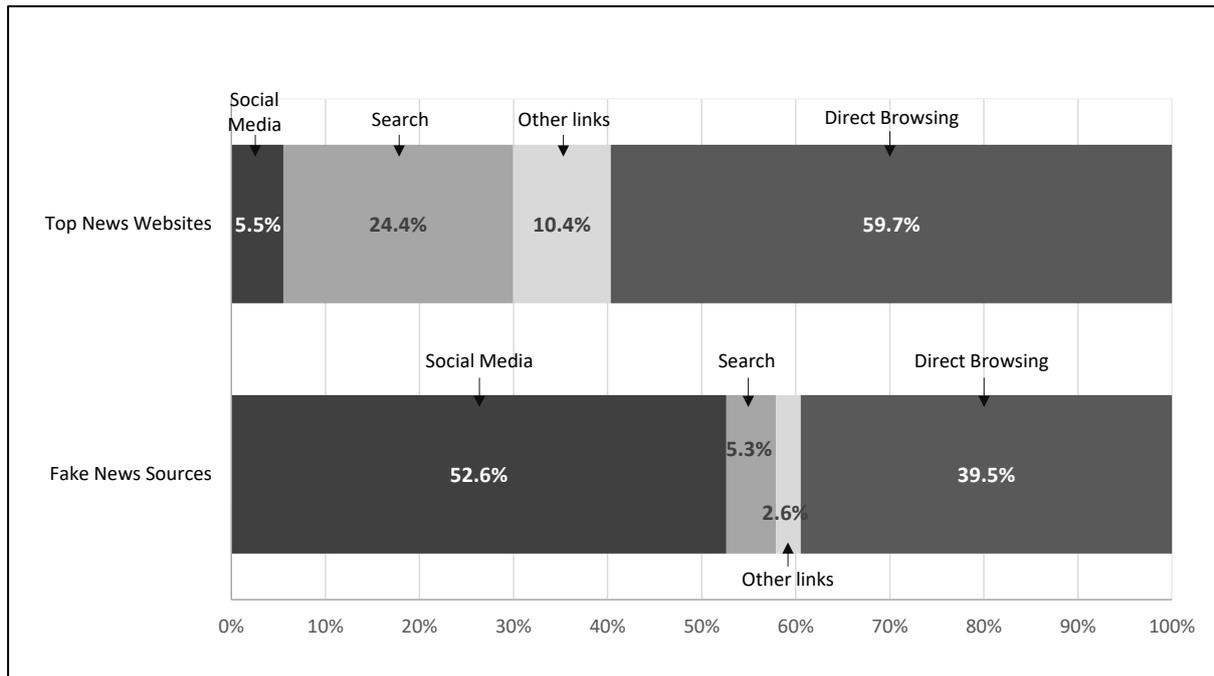


Note: This figure presents the percentage of daily pageviews of the main fake news sources relative to the total daily page views from top news websites. The fake news sources are segmented by political orientation (right or left-wing). Data are from Alexa (alexa.com).

Figure 14 shows the same relative measure of page views as presented in Figure 13 but here segmented by political orientation. Here, it becomes clearer that, despite the fact that the fake news phenomenon can be attributed to both right and left-wing sources during the presidential election campaigns in 2018, it is likely that a significantly higher amount of disinformation was spread and consumed by right-leaners. By observing that both peaks of access on days before the first and the second round of presidential voting are concomitant with the circulation of the most symbolic and disseminated right-leaning fake news stories – as shown in the Figures 10 and 11 – it could be also suggested that people were more engaged or convinced by them.

Considering the fact that fake news stories shared days before the elections were amongst the ones that generated unproportionally high engagement over online platforms, it also infers the importance of social media to fake news outlets. One way to scale the degree of the importance of social media for fake news suppliers is to measure the source of their web traffic (Allcott, 2017). In other words, from which platform do people who access these websites come? Do people consider these websites as relevant sources of news to be accessed directly? Are they considered relevant pages by search engines to be displayed among the first results?

Figure 15
Share of Visits to News Websites in Brazil by Source



Note. This figure presents the share of traffic from different sources for the top 15 news websites and the top 10 fake news websites in Brazil. “Other links” means page visits (impressions) that were referred from sources other than social media and search engines. “Direct browsing” means page views from direct requests of URLs, therefore not having a referral source. Sites are weighted by number of monthly visits. Data are from Alexa.

Figure 15 shows a comparison of the web traffic sources for the top mainstream news outlets *versus* the top fake news websites in Brazil. As mentioned before, each time a user visits a webpage, that “page view” hit is recorded. Among the recorded data, there is information that tells if the user has either navigated directly by browsing (for instance, typing uol.com.br into a browser) or has been brought (or referred) from some other site/link. Relevant referral sources include social media platforms (for example, clicking on a link in Twitter or in the Facebook news feed) and search engines (for instance, searching for “Fraud on elections” on Google and clicking on a displayed search result). Notably, in Figure 15, while social media referrals represent less than 6% of traffic for the top 15 news websites, they represent a much higher share of traffic for fake news websites, being their most relevant source of traffic (52.6%).

These results show how fake news outlets rely much more on social media than traditional news sources. Considering that 64% of adults get news from social media (Reuters Institute, 2019), the prevalence of disinformation on social media might be concerning. In addition to it, as presented earlier, an expressive part of voters in 2018 demonstrated active engagement on sharing or commenting about news in social media. Still, according to the study from Reuters Institute, 58% of people reported to share news via social media, messaging, or

email and 36% to comment on news via social platforms or websites. Among the voting population with Facebook accounts in Brazil, reading (45%) and sharing (21%) political news were common behaviours. Particularly on WhatsApp, such practices were even more frequent, both for reading (46%) and for sharing (24%).

This suggests that a great part of the total audience exposure to fake news could have occurred in social media platforms, where content circulates more fluently, and sources are harder to traceback – due to the closed or semi-closed nature of networks. To the extent that people are less likely to engage in analytical reasoning while navigating on social media (Moravec, Randall and Dennis 2018), being exposed to potentially fake news in such situation would make them more vulnerable to disinformation, once the lack of reasoning negatively affects the ability to judge the accuracy of disinformation (Pennycook and Rand, 2017).

5.2 Distribution Platforms

As explored in the literature review, there are varied ways to understand the spread of fake news in social media platforms. Considering the main purpose of understanding the phenomenon from a multiplatform perspective and relate it to the cognitive and external factors that allowed its continuation, this study chooses to analyze the social media as distribution platforms. From the filtered data set of fake news stories, it was possible to gauge the importance of Facebook, WhatsApp, and Twitter for the circulation of the most relevant stories. As explained before, for each of the 58 stories, it was analyzed which – if not all – of the platforms were relevant during their spread and it was also possible to measure it by calculating the number of times a *unique fake news story* was shared on both Facebook (shares) and Twitter (retweet).

5.2.1 Social Media as Distribution Platforms

Table 3

Distribution Platforms - The Circulation of Fake News

Platforms	Number of Fake News Stories	Percentage from Total	Shares (volume)	Percentage from Total
Facebook Only	25	43%	2,228,556	54%
Facebook and WhatsApp	1	2%	159,791	4%
Facebook, WhatsApp and Twitter	32	55%	1,766,697	43%
Total	58	100%	4,155,044	100%

Note. For the 58 Fake News Stories analysed, “Twitter only”, “Facebook and Twitter”, and “WhatsApp and Twitter” were not relevant combinations of distribution platforms. Shares (volume) is a parameter for the spread of each fake news story, calculated by the sum of the number of shares (Facebook) and retweets (Twitter) received.

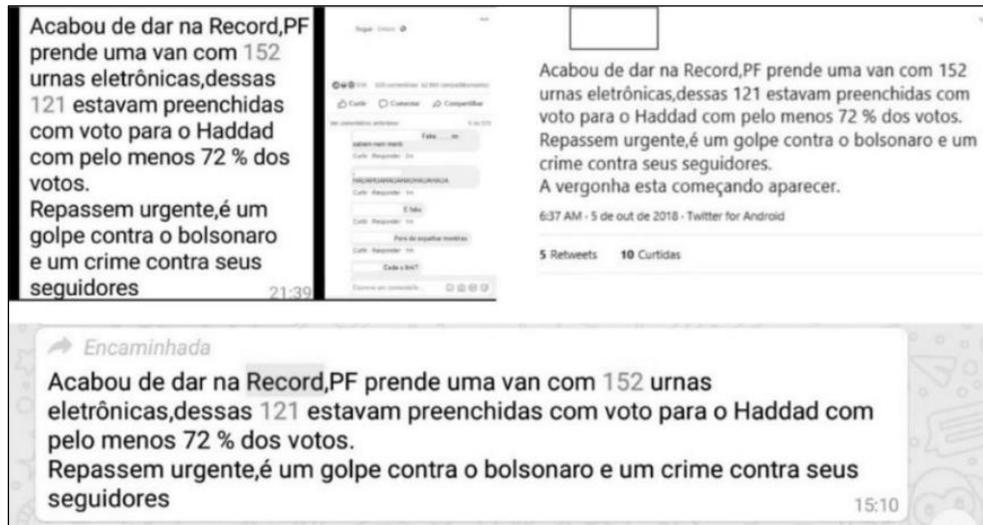
From Table 3, it is noticeable that all platforms were substantially important for the dissemination of the 58 most relevant fake news during the presidential elections. However, among them, Facebook was clearly more predominant both in terms of number of *unique fake news stories* spread and how many times they were shared. It is also noteworthy to mention that, from the total number of shares of 4.1 million, 97% is attributed to Facebook, while mere 3% comes from Twitter (retweets).

As expected, these results indicate that the spread of fake news in Brazil was not restricted to a single platform. Since in Brazil 84% of people use WhatsApp on a frequent basis, followed by Facebook (54%) and Twitter (28%), there is no reason to believe that the content would be restricted to one environment.

Because social media platforms are designed to facilitate the access to information and encourage users to avidly consume and engage with content by reading and sharing it (Epstein, 2018; Mosleh, 2019; Pennycook, 2019), actions such as forwarding or reproducing a certain story among different platforms would be relatively effortless. Figure 16 shows one example of a major piece of fake news shared over all the three platforms with virtually no variations in its content.

Figure 16

Fake News Story (ID: 30) – The Federal Police Seized a Van Carrying Filled Ballot Boxes.



Note. See Appendix C (ID:30) for more details. “Breaking news in Record, the Federal Police seizes a van with 152 electronic ballot boxes out of which 121 were filled with votes for Haddad with at least 72% of total votes. Share it urgently, this is a coup against Bolsonaro and a crime against his followers.”. Source: Dourado, 2019.

From the figure, it is possible to see that no efforts were made in order to change or adapt the content of the text. Nonetheless, it would be imprecise to assume that different types of content (e.g., images, videos, text) have the same fluidity from one social media to another. For instance, during the data collection, it was noticed that YouTube – not explored in this study - was a relevant hosting platform for videos that were shared on Facebook or Twitter, since various websites also had a channel on the social media.

Interestingly, even if the fake news story in Figure 16 did not present variations on its content, there was a significant difference on the levels of engagement within Facebook (shared 328 times) and Twitter (5 retweets) by the picture was taken. Such disparity, also observed in a broader context (see table 3) was expected, but in lower levels.

According to an empirical study from the FGV Department of Public Policy Analysis (Ruediger and Grassi, 2019), Twitter was an instrumental social media for the spread of political news and also served as a major polarization amplifier during the presidential elections of 2018 in Brazil. For instance, the number of mentions about Haddad’s supposed “gay kit” (see Appendix B) and the existence of fraud in the election (see Appendix B and C) were more than 1 million for each narrative. Other relevant themes that generated significant engagement were also related gender ideology. Hence, despite the fact that mentions are fundamentally different than retweets (re-posting of a tweet), they can be both used as measures of reach and

popularity of a certain theme. Nevertheless, these numbers are not directly translatable to the spread of fake news – since a tweet may contain a mention to a fake news story but not necessarily have the deceiving content.

Still according to the study, a particular strategy adopted to spread fake news on Twitter was the automatization of interactions, resulting in dissemination cascades. After extensive analysis of mentions, retweets, and profiles, only from September 5 to 11, the study mapped 250 bots (automated profiles) that amplified discussions “about the presidential hopefuls, which remained above 10% every week in September” (Ruediger and Grassi, 2019). This shows that, for each social media, different approaches were adopted to disseminate disinformation, and as a result, they can also be analysed distinctly.

Similar to the analysis and findings from FGV DAPP study on Twitter, it was also possible to categorize the most relevant fake news into specific narratives that were built over the elections period.

Following the methods of narrative and holistic content analysis from Koch (1998) and Maivorsdotter and Lundvall (2009) and Lieblich et al (1998), four major categories were identified and each of the main 58 fake news stories was classified accordingly. The nomination of the categories (Table 4) was also based on Dourado (2020) and other studies that focused on analysing the format and content of such stories (D.F.R.L; Evangelista and Bruno; Resende et al., 2019).

Table 4
Main Narratives of Fake News Stories

Narrative	Examples of Fake News	Most representative words
Anti-left/anti-workers party	a. Images circulated of a check that was supposedly part of a workers' party corruption scheme. b. Messages alleging that the workers' party would make Brazil similar to Venezuela.	PT, party, Lula, Haddad, Manuela, left, communist, socialism, corrupt
Electoral Fraud	a. Various images and videos showing voting machines allegedly forcing or manipulating voters to cast a ballot for Haddad.	Elections, fraud, ballot, votes, machine
Gender ideology/child sexualization	a. Haddad is accused of paedophilia and being a supporter of incest b. Messages claiming that, if elected, Haddad would make children a property of the state at the age of five and their gender would be chosen then.	Paedophilia, children, age, gender, book, marriage, gay
Anti-media	a. Messages intended to harm the reputation of media vehicles and research institutes. b. Messages calling for the boycott of media outlets.	Manipulation, fake, media, Globo, Datafolha, pay, receive, boycott

Note. This table shows the four main narratives identified from content of the 58 most relevant pieces of fake news. Stories that did not fit into any of the four categories would be allocated to "other narrative".

Table 4 shows the categories into which the *unique fake news stories* were distributed, whereas the words on the third column served as a reference to orient the first step of classification. Notably, these themes are also related to the categories showed in Figure 8, which were measures of general trust in different institutions (e.g., Media Vehicles, Electoral System, Presidency, Federal Government).

Table 5
Relevance of Narratives in each Distribution Platform

Narrative	Platform			Total (no overlaps)
	Twitter Nr of fake news (% of fake news)	Facebook Nr of fake news (% of fake news)	WhatsApp Nr of fake news (% of fake news)	
Anti-left/anti-workers party	14 (44%)	24 (41%)	15 (45%)	24 (41%)
Electoral Fraud	7 (22%)	14 (24%)	7 (21%)	14 (24%)
Gender ideology/child sexualization	5 (16%)	8 (14%)	5 (15%)	8 (14%)
Anti-media	3 (9%)	6 (10%)	3 (9%)	6 (10%)
Other	3 (9%)	6 (10%)	3 (9%)	6 (10%)
Total	32 (100%)	58 (100%)	33 (100%)	58 (100%)

Note. This table presents (1) the number of fake news stories segregated by narrative in each distribution platform and (2) the corresponding relevance of each narrative per platform. Most of the *unique fake news story* circulated in more than one platform.

From the Table 5, it is noticeable that in all the three social media platforms, the predominant narrative of the major fake news is the rejection towards the Workers' Party that, as discussed during the contextualization of the case, was involved in corruption scandals, and was blamed for a faulty administration that led the country to a deep economic crisis (Davis, 2020). This is an evidence of the polarized characteristic of fake news, majorly affecting either the Workers' Party candidate Haddad, or Bolsonaro, a candidate who was presented as the main adversary of left-leaning parties.

Also following the historical sentiment of distrust – or continued decline in trust and confidence (exposed in Figure 8) - in institutions, other relevant categories include fake news that mentioned different frauds on the election process and stories that intended to harm the reputation of traditional mass media vehicles, such as Globo, Veja, Datafolha or Ibope (Fake News IDs: 4 and 50 in appendix B and C).

The distrust in institutions and attempts of harming the reputation of institutions was also seen in the spread of disinformation during the U.S presidential elections. According to Allcott et. al. (2017), such decline of trust could be both a cause and a consequence of fake news gaining more traction. Regardless, such lack of confidence on reputable sources of information could also lead people to resort to other alternative sources of information such as social media networks (e.g., page profiles, public or closed groups with friends or family) or alternative websites – and among them, fake news outlets (Appendix A).

Differently from the aforementioned narratives, fake news stories categorized under “gender ideology/child sexualization” generally seemed to explore fears and prejudices – as also noticed in Resende et al. (2019) – by using sensational and controversial headlines and employing emotional language.

Figure 17

Fake News Story (ID: 24) – Children Become State Property.

Note. See Appendix C (ID: 24) for more details. “Upon completing five years old, children become state property! It is up to us to decide if a boy will be a girl and vice versa! Parents must respectfully accept our decision! We know what is best for children! – Fernando Haddad”. Source: Aos Fatos, 2018.

Figure 17 shows a widely spread fake news story, classified in this study under “gender ideology/child sexualization”. As appointed in different studies, the surprise and drama on these headlines are instruments to draw in users’ attention (García-Perdomo et al. 2018) and the emotions from reading the content affect the belief in fake news (Pennycook, 2019), potentially influencing on sharing decisions (Vosoughi et al. 2018, Martel et al, 2019), once content that encourages strong feelings such as anger is more likely to be shared (Harber and Cohen 2005; Berger and Milkman 2012; Valenzuela et al. 2017).

A common characteristic of the major fake news spread during the elections was to contemplate attempts to harm the reputation of candidates – such as in Figure 17 – and to drive polarization by emphasizing narratives such as right-wingers *versus* left-wingers or Bolsonaro’s supporters against Haddad’s – ubiquitous during the second round of elections.

Table 6
Partisanship of main Fake News stories

Partisanship	Nr of Fake News (% from total)	Shares (volume) (% from total)
Pro-Bolsonaro (Anti-Haddad)	52 (90%)	3,961,934 (95%)
Pro-Haddad (Anti-Bolsonaro)	5 (9%)	192,593 (5%)
Other	1 (1%)	517 (0%)
Total	58 (100%)	4,155,044 (100%)

Note: This table presents (1) the number of main fake news stories segregated by partisanship and (2) the number of times they were shared in social media (Facebook and Twitter).

Among the 58 most relevant fake news, there is a prevalence of pro-Bolsonaro (Anti-Haddad) content, both in terms of published stories and engagement. A comparison between this result and with initial sample of 332 fake news stories (Table 2) implies that not only more of the fake news reported by the five fact-checking organizations are right-leaning, but they also generated more engagement. From the previous sample, 71% of the stories supported Bolsonaro, whereas 17% worked in favour of Haddad.

There could be diverse possible explanations for this preponderance of pro-Bolsonaro fake news. According to a survey conducted before the first election round (Datafolha, 2018), among Bolsonaro's voters, 81% have social media accounts and 57% used Facebook as a source of news and 31% shared some political content. Comparing to Haddad's voters, only 40% used the platform for the same purpose and only 21% shared similar content. This suggests that part of the generated engagement might have come from a higher exposure right-leaning fake news. It could also mean that right-wing voters are more inclined to either believe or share fake news. Supporting this idea, the survey conducted by IDEIA Big Data/Avaaz (2018) showed that 85,2% of Bolsonaro's voters were exposed to a fake news regarding the "gay kit" (see appendix B, ID: 7) and 83,7% believed in it. Among Haddad's supporters, 61% were exposed and only 10,5% were convinced by it.

By comparing the proportion of pro-Bolsonaro fake news mapped during this analysis with the relevance of the top fake news sources – measured by the traffic from each website - from Figure 12, there is a substantial difference on how partisanship is represented. Considering the total traffic from main fake news outlets, right-wing websites were responsible

for 68.2% of it. Nevertheless, as exposed in Table 6, pro-Bolsonaro fake news stories are much more prevalent both in terms of number (90%) and engagement (95%) generated. Although there is a fundamental difference on the supply (published fake news story) and demand (traffic from websites), this asymmetry could be maybe explained by the influence of platforms such as WhatsApp, for instance, implying that great part of the circulation and exposure to fake news might have occurred among public or closed groups within the platform. Supporting this idea, a study that monitored the spread of disinformation on 296 WhatsApp groups during the campaign period (Machado et al., 2019) found that, among the thousands of viral messages shared, 42% of right-leaning items (e.g., audio or text messages, images, videos) contained information found to be false by fact-checkers, opposing to 3% from left-leaning messages – showing a similar level of partisanship in relation to the main fake news stories (Table 6).

In Brazil, WhatsApp may have played a crucial role as a vehicle for disseminating fake news. As mentioned before, one explanation for its astonishing penetration rate of 91% among internet users - or 120 million citizens (Fenelon and Torresan, 2020) – is the fact that the price of an SMS has a cost of 55 times more than one in the U.S. and that, usually, the messaging app integrates zero-rating plans, which corresponds to 56% of total mobile plans (Teleco, 2020) - exempting it from data consumption. Thus, the app is in fact is a primary enabler of online communication not only from one person to another, but for entire groups.

According to the Reuters Institute survey (2019), 58% of WhatsApp users in Brazil are part of some group with people they do not know (public groups) – a much higher proportion than mere 12% in the UK. Notwithstanding, Brazilians are also more inclined to discuss news and politics in these groups (18%) when compared to the latter (2%). Considering that the app is a closed environment that impose greater barriers for fact-checking content, people who have technical or financial restrictions to access online news sources become less capable of spotting a fake news story shared within groups - which, perhaps, make them more likely to fall prey for disinformation.

An important statistic highlighted before (The Wilson Center, 2018) shows that the group represented by the “functionally illiterate” - almost one third of Brazilians from 15 to 64 years of age – could be even more vulnerable to fake news, once they are overwhelmingly present on social media platforms – corroborating for the exposure to disinformation - and are less likely to fact-check the information they consume or to question unfounded claims and sources.

Reinforcing the possibly higher susceptibility to fake news within groups, research shows that, in ambiguous situations, people tend to rely on the use of mental shortcuts or heuristics (McDougall, Brites, Couto and Lucas, 2019) to make decisions. Hence, in a situation where, for instance, people are incapable to deliberately check the veracity of a story – or not motivated enough to do so -, social endorsements may work as credibility cues (Messing and Westwood, 2012), influencing judgements to determine if that story is true or not (Sakamoto, 2010; Bond et al., 2017). This is one possible way to explain why information on WhatsApp seems more credible when the messages are forwarded and reforwarded by friends and family – trustworthy sources or members of trusted groups.

Research also shows that heuristics is often used to make decisions that conform to socially established norms. For instance, in a political discussion within a left or right-leaned group in WhatsApp – such as those monitored in Bursztyn (2019) - the choice to believe and share a story may also be oriented to conform with socially established norms. And this could be also valid not only to one platform, but to all social media networks analysed in this study.

Finally, when put together, the influence of trustworthy sources and the desire for social conformity also seem as an especially relevant factors that may contribute to the spread information – and disinformation -, considering that 72% of WhatsApp users are part of some private group with people they know well (Reuters Institute, 2019), such as friends, colleagues, and family and, particularly in Brazil, 53% of people use WhatsApp for getting news.

6 Conclusion

This study sought to understand how fake news spread by analysing its main sources and how it circulates in social media platforms such as Facebook, Twitter, and WhatsApp. For such, a case study methodology was chosen as an instrument to explore the phenomenon under the point of view of the 2018 Presidential Elections in Brazil. This is a first step in order to understand, monitor and possibly mitigate the spread of fake news and its social implications

This is a first step in order to understand, monitor and possibly mitigate the spread of fake news and its social and economic implications in Brazil, which presents a serious problem to democracies and their fundamentals such as electoral processes.

From one side, fake news rapidly evolve and spread with an ever-increasing pace with the overwhelming adoption of social media platforms. From the other side, literacy and education-based solutions are long term responses. Also, attempts to regulate social media platforms and control the dissemination of disinformation must be considered at ease once content moderation could trespass the threshold of freedom of speech.

Accordingly, to establish what fake news is, this study relied on theoretical literature. Behind the craft of disinformation, there should always be a deliberate intention to mislead and publish incorrect information while claiming it to be accurate in order to gain political, social, or economic advantage.

Notably, algorithms, bots, or fake accounts are not the ones that drive the greatest part of fake news. To the extent that reaching or persuading people are the utmost goals of fake news creators and publishers, this is a social problem. They are created to mobilize sentimental responses, to influence behaviours and explore biases, fears, and preconceptions.

Yet, social media platforms are used as distribution platforms for diverse types of content – including disinformation – and are mostly guided by the principle of freedom of expression. Thus, the exposure to fake news is a result from the interactions between social media users and algorithms, that act as primary filters to the content people are exposed to.

Externalities also corroborate to the spread of disinformation. The behavioural changes on the way people interact with one another – often preferring a rapid exchange of messages over real conversations -, the spiking demand for consuming news from online sources, the increasing distrust in institutions and media vehicles and the overwhelming adoption of social media platforms are some of the fundamental circumstances that provided a fertile sole to fake news. The prevalence of mental shortcuts or the importance given to social engagement metrics

– such as number of likes, times shared – to evaluate the veracity of content has reached a new level. Frequently, people are perhaps more likely to believe in information shared by friends or even by strangers with whom they share a group on social media rather than content published by reputational news sources. Also, the predisposition to fact-check information that is often received in “small doses” seems to be increasing, once more people are relying in heuristics.

To understand the complex phenomenon that is fake news from both supply and demand perspectives, a first step was to compile a relevant sample of fake news stories spread during the elections. For such, a data set built in Dourado (2020) was instrumental. From that point, the main websites responsible to share fake news stories were mapped analysed in terms of traffic generated. Similar to the spread of fake news during the 2016 U.S. Presidential Elections, a high concentration of traffic was found, meaning that the top five sites were responsible for almost 80% of the total traffic towards fake news sources. Nevertheless, when put in perspective, the total traffic of fake news outlets is belittled by the traffic from the top 15 mainstream news outlets. Additionally, it was also found that fake news outlets primarily rely on social media as sources of traffic, a polar opposite from the characteristics of traditional news websites.

Furthermore, in order to explore the circulation of disinformation in different social platforms, a subsequent step was to filter the initial sample by relevance – fact-checked by at least three organizations - and reach, resulting in the 58 most relevant *unique fake news stories*. Different analysis revealed that, while all the three social media platforms were important for the circulation of the fake news from the sample, Facebook was a prepondering distribution channel. Additionally, it was also found that the predominant narratives among the most relevant fake news were four – and were likely based on the distrust over institutions, fears, insecurities, and popular sentiments mobilized in historical periods. Similarly to the previous results, it also was found that the fake news stories were highly partisan, favouring the right-wing candidate Bolsonaro in more than 90 percent of cases.

Finally, from triangulating data and considering the cognitive and external factors that might have affected the disposition to believe and spread fake news, it is suggested that the circulation of disinformation in WhatsApp - mostly within private groups with family members and friends – occurred on orders of magnitude higher than on open or partially open social media networks. Despite that, it is not technically feasible to obtain a concrete answer this

question, once these groups are closed environments and data from WhatsApp is subjected to end-to-end encryption.

An inherent challenge of studying phenoms that mostly occur in the digital environment is the limited access to data or to build a representative and unbiased sample – in the most possible extent. Thus, for this study, the same limitations are applicable. Also, despite the efforts on gathering data related to fake news stories spread during the analysed period, numerous images, posts, accounts, and websites are no longer available – a possible consequence of choosing a case study as a method. Needless to say, considering the principles in which social media are based on, the access to data is restrict, which often causes the unviability of diverse research. Nonetheless, this study sought to understand the phenomenon in a multiplatform perspective by applying multiple methods of analysis to reach to its results and conclusions.

However, regardless of analysing the phenomenon from a specific case or under multiple perspectives, to the extent that the spread of fake news results in significant social costs for individuals and institutions, it should be vehemently combated.

Theoretically, market failures and inefficiencies that lead to social distortions should be diminished. For instance, working to eliminate the technical restrictions on accessing information would make news consumers more able to infer the true state of the world and perhaps more prone to fact-check content, consequently making them less vulnerable to fake news.

Technology companies such as Google, Facebook and Twitter are trying to tackle the challenges imposed by fake news through different strategies. They are removing websites that violate their policies, implementing alerts and disclosing the sources of information, showing fewer potentially false stories to users, and working side by side with public institutions and governments to delineate countermeasures. Yet, organizations from the private sector are also exposed to financial and reputational risks and should, therefore, also take actions to assess vulnerabilities to attacks, monitor and leverage digital channels, and educate, and capacitate employees, among other measures (Upton et al., 2021).

Therefore, future studies could explore possible solutions for one or more deceiving aspect of fake news – such as the factors related to its virality, or what makes people more vulnerable to it – for one or more social media platforms.

Particularly in Brazil, movements such as the Sleeping Giants (Canaltech, 2020) have proven to be effective on cutting the financial incentives regarding advertising revenues of fake news sources. For such organizations that help in the battle against disinformation, a prominent topic has been the recurring spread of COVID-19 related fake news and its use by the current government in attempts to minimize the severity of the pandemic and increase distrust in public data (Ricard, J., & Medeiros, J. (2020). Thus, studies that explore the weaponization of fake news during the pandemic, its consequences, and possible ways to reduce the incentives on the supply side of disinformation are socially relevant.

In a legal perspective, legislators are also trying to tackle the challenge mostly by implementing legal restrictions such as a bill to individuals who are found culpable for spreading fake news (Nobre, 2020). Hence, other studies could also explore the extent of how these measures affect the freedom of speech and interfere in democratic principles. Yet, these are just the initial steps to combat the pervasive and long-lasting phenomenon of fake news.

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8 Appendix

Appendix A – Fake News Websites

Source of Fake News	Partisanship	Available or not
agoranoticiasbrasil.com.br	Right-wing	Available
blogdovavadaluz.com	Right-wing	Available
blogdowillianvieira.com.br	Left-wing	Available
brasilparalelo.com.br	Right-wing	Available
camacanbahia.com.br	Right-wing	Available
cartamaior.com.br	Left-wing	Available
cleuberCarlos.blogspot.com	Right-wing	Available
cn7.com.br	Left-wing	Available
conexaopolitica.com.br	Right-wing	Available
conexaotrespontas.com.br	Right-wing	Available
criticanacional.com.br	Right-wing	Available
deolhonews.com.br	Right-wing	Available
diariocarioca.com	Right-wing	Available
diariodobrasil.org	Right-wing	Available
diariodocentrodomundo.com.br	Left-wing	Available
djalmarodrigues.com.br	Right-wing	Available
esmaelmorais.com.br	Left-wing	Available
f7noticias.com	Right-wing	Available
falandoverdades.com.br	Left-wing	Available
folhadoprogresso.com.br	Left-wing	Available
folhainterior.com.br	Left-wing	Available
folhapolitica.org	Right-wing	Available
g17.com.br	Right-wing	Available
genpaulochagas.wordpress.com	Right-wing	Available
hcn7.com.br	Right-wing	No longer Available
ilisp.org	Left-wing	Available
imprensaviva.com	Right-wing	No longer Available
indicatu.com.br	Left-wing	Available
jornal21brasil.com.br	Right-wing	No longer Available
jornalcorreiodovale.com.br	Right-wing	Available
jornaldacidadeonline.com.br	Right-wing	Available
jornaldacidadepi.com.br	Right-wing	Available
jornaldopais.com.br	Right-wing	Available
juliobrates.com	Right-wing	Available
leituradebordo.com.br	Right-wing	Available
midiaimparcial.com	Right-wing	No longer Available
mysael.com	Right-wing	No longer Available
newsatual.com	Right-wing	Available
newsrondonia.com.br	Right-wing	Available
noticiario.com.br	Right-wing	Available
ofluminense.com.br	Right-wing	Available
oobservador.com.br	Right-wing	Available
opiniaocritica.com.br	Right-wing	Available
otaviosaleitao.com.br	Right-wing	Available
peloamordeus.com	Right-wing	No longer Available
pensabrasil.com	Right-wing	No longer Available
plantaobrasil.net	Left-wing	Available
politicanarede.com.br	Right-wing	Available
portalc7.com	Right-wing	Available
presidentebolsonaro.com	Right-wing	Available
redegni.com.br	Right-wing	No longer Available
renovamidia.com.br	Right-wing	Available
republicadecuritiba.net	Right-wing	Available
semprequestione.com	Right-wing	Available
sensoincomum.org	Right-wing	Available
soviuagora.blogspot.com	Right-wing	Available
tercalivre.com.br	Right-wing	Available
thejornalbrasil.com.br	Right-wing	No longer Available
tudooknoticias.com.br	Right-wing	Available

Note. List of websites that published fake news during the presidential elections of 2018 in Brazil. Elaborated by the author.

Appendix B – Main Fake News Stories (Part 1)

Note. Data set of the main *unique fake news stories*. Titles are translated. Elaborated by the author.

ID	Appendix	Date	Shortened Title (translated)	Week	Shares (Volume)	Political Bias	Narrative	Facebook	Whatsapp	Twitter
1		07/08/2018	A student was expelled from the classroom for supporting Bolsonaro	2	79,474	Pro-Bolsonaro (Anti-Haddad)	Other	Yes	No	No
2		13/08/2018	Lulima illegally received R\$317 million	3	2,265	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
3		20/08/2018	Arnaldo Jabbor says Amodeo would go to the second round	4	43,655	Pro-Haddad (Anti-Bolsonaro)	Other	Yes	No	No
4		24/08/2018	Datafolha survey that shows Lula's ahead was fake	4	21,046	Pro-Bolsonaro (Anti-Haddad)	Anti-media	Yes	No	No
5		28/08/2018	Marina Silva's husband illegally harvested wood in 2003	5	26,444	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
6		28/08/2018	Venezuelans are receiving voter registration to vote in October	5	24,908	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
7		29/08/2018	Images of the gay kit created in Haddad's management leak on the internet	5	49,395	Pro-Bolsonaro (Anti-Haddad)	Gender ideology/child sexualization	Yes	Yes	Yes
8		31/08/2018	Photo shows men of criminal factions with a poster against Bolsonaro	5	6,071	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
9		06/09/2018	Man who tried to kill Bolsonaro was from the PT	6	13,808	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
10		06/09/2018	Bolsonaro's aggressor is affiliated to PT of MG	6	9,506	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
11		14/09/2018	Fátima Bernardes renovated the house from Bolsonaro's stabber	7	24,913	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
12		16/09/2018	Video shows a march in Campinas on behalf of Bolsonaro's health	7	238,300	Pro-Bolsonaro (Anti-Haddad)	Other	Yes	Yes	Yes
13		17/09/2018	Poll shows Bolsonaro winning in all states	8	10,093	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes
14		18/09/2018	TSE handed over ballot box codes to Venezuela and denied access to Brazilian auditors	8	78,400	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes
15		20/09/2018	Patricia Pillar says she was victim of aggression by Ciro	8	65,575	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
16		21/09/2018	Audio message shows Bolsonaro abusing employees in a hospital	8	63,523	Pro-Haddad (Anti-Bolsonaro)	Other	Yes	Yes	Yes
17		24/09/2018	Jean Wilius received an invitation to be Haddad's Minister of Education	9	219,800	Pro-Bolsonaro (Anti-Haddad)	Gender ideology/child sexualization	Yes	Yes	Yes
18		28/09/2018	João Amodeo's deputy asks Bolsonaro for votes	9	54,861	Pro-Bolsonaro (Anti-Haddad)	Gender ideology/child sexualization	Yes	Yes	Yes
19		28/09/2018	PT congressman bribed teachers to make video against Bolsonaro	9	24,053	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
20		28/09/2018	With Haddad's support, Jean Wilius intends to create a law to compel gay marriage in churches	9	3,627	Pro-Bolsonaro (Anti-Haddad)	Gender ideology/child sexualization	Yes	No	No
21		29/09/2018	OAS Director recognizes fraud at the polls in favor of PT	9	13,000	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	No	No
22		01/10/2018	The picture of a demonstration of women against Bolsonaro is doctored (fake)	10	65,049	Pro-Bolsonaro (Anti-Haddad)	Anti-media	Yes	Yes	Yes
23		01/10/2018	Pro-Bolsonaro demonstration is the largest in Brazil's history	10	31,330	Pro-Bolsonaro (Anti-Haddad)	Anti-media	Yes	No	No
24		02/10/2018	Haddad said that children would become state property and could have their gender chosen	10	148,000	Pro-Bolsonaro (Anti-Haddad)	Gender ideology/child sexualization	Yes	No	No
25		02/10/2018	Vote is invalidated if voter votes for only one position and chooses null or blank for the others	10	517	Other	Electoral Fraud	Yes	No	No
26		03/10/2018	Datena recorded video in support of Bolsonaro	10	33,309	Pro-Bolsonaro (Anti-Haddad)	Anti-media	Yes	No	No
27		05/10/2018	Protesters went naked in a march against Bolsonaro	10	142,793	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
28		05/10/2018	Palocci denounces fraud in electronic voting machines made by PT in 2014	10	117,494	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	No	No
29		05/10/2018	Fábio Bolsonaro is seen with a t-shirt that swears at northeastern Brazilians	10	63,555	Pro-Haddad (Anti-Bolsonaro)	Other	Yes	No	No

Appendix C – Main Fake News Stories (Part 2)

Note. Data set of the main *unique fake news stories* (continuation). Titles are translated. Elaborated by the author.

ID	Appendix	Date	Shortened Title (translated)	Week	Shares (Volume)	Political Bias	Narrative	Facebook	Whatsapp	Twitter
30		05/10/2018	The Federal Police arrested a van with 152 electronic ballot boxes defrauded by Haddad	10	43,957	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	No	No
31		06/10/2018	Haddad has made a video saying gave up on the presidential elections	10	397,966	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
32		06/10/2018	Rodrigo Santoro wearing a t-shirt in support of Bolsonaro	10	236,861	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
33		06/10/2018	Haddad's deputy, Manuela D'Ávila, says Christianity will disappear	10	128,310	Pro-Bolsonaro (Anti-Haddad)	Gender Ideology/child sexualization	Yes	No	No
34		07/10/2018	Fraudulent electronic ballot box shows a vote for Haddad when I is typed	10	496,688	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	No	No
35		07/10/2018	TSE wants to annul votes of those who wear Bolsonaro shirt	10	1,331	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	No	No
36		08/10/2018	Haddad has 9999 votes in a section with 777 voters, shows ballot box	11	131,054	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes
37		09/10/2018	Haddad confesses that Lula will be the real president in case of victory	11	180,278	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
38		09/10/2018	Haddad links the PT to fascism and Nazism	11	159,791	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	No
39		09/10/2018	Haddad's campaign defends confiscation of property	11	55,177	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
40		11/10/2018	7.2 million computered votes in voting machines were canceled on the last Sunday	11	1,941	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes
41		11/10/2018	Bolsonaro's son offends Northeastern residents who voted for Haddad	11	1,037	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
42		16/10/2018	A book written by Haddad encourages incest	12	62,461	Pro-Bolsonaro (Anti-Haddad)	Gender ideology/child sexualization	Yes	Yes	Yes
43		16/10/2018	Haddad owns a Ferrari	12	44,213	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
44		16/10/2018	Bolsonaro will change the image of the patron saint of Brazil	12	19,654	Pro-Bolsonaro (Anti-Bolsonaro)	Gender ideology/child sexualization	Yes	Yes	Yes
45		19/10/2018	Haddad praises Maduro in Twitter post	12	29,776	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
46		23/10/2018	Electronic ballot boxes pre-filled with votes for Haddad were seized in a private car in Amazonas	13	31,133	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	No	No
47		24/10/2018	Lula was allowed to give an interview from jail before the second round	13	2,800	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
48		26/10/2018	Ameilina Teles killed soldiers in the dictatorship	13	182,630	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
49		27/10/2018	A company hired by the TSE has connection with PT	13	67,560	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes
50		27/10/2018	Datalinha computed votes in Bolsonaro for Haddad	13	17,702	Pro-Bolsonaro (Anti-Haddad)	Anti-media	Yes	Yes	Yes
51		27/10/2018	Avtron Senna Institute authorized music for Bolsonaro campaign	13	16,447	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
52		27/10/2018	Research from BTG Pactual shows Bolsonaro's victory	13	12,434	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
53		27/10/2018	FHC declared support for Fernando Haddad	13	4,206	Pro-Haddad (Anti-Bolsonaro)	Other	Yes	Yes	Yes
54		27/10/2018	Car bomb that would be used in attack on Jair Bolsonaro is seized	13	2,824	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	Yes	Yes
55		28/10/2018	OAS held strange or secret meetings with PT	13	73,426	Pro-Bolsonaro (Anti-Haddad)	Anti-left/anti-workers party	Yes	No	No
56		28/10/2018	Ballot box in Pará annulled votes for Jair Bolsonaro	13	66,757	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes
57		28/10/2018	On Veja cover, Joaquim Barbosa asks not to vote for PT	13	5,335	Pro-Bolsonaro (Anti-Haddad)	Anti-media	Yes	Yes	Yes
58		28/10/2018	Electronic voting machines are scheduled for daylight saving time	13	2,531	Pro-Bolsonaro (Anti-Haddad)	Electoral Fraud	Yes	Yes	Yes