Follow the Money: How the Online Advertising Ecosystem Funds COVID-19 Junk News and Disinformation

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ABSTRACT

As people around the world turn towards search engines to access information about COVID-19, it is important to understand why and how users are being exposed to junk news content. In this memo, we examine the role of search engines and their optimization processes in directing traffic towards junk news & disinformation about COVID-19, and how these sites, in turn, monetize that traffic through digital advertising. We ask:

- How do the search engine optimization strategies of professional news sources compare to those of junk news & disinformation sources?
- In what way do third party sites boost the online reputation of junk news and disinformation on COVID-19 through backlinks?
- How and to what extent do major advertising platforms monetize junk news & disinformation around COVID-19?

Comparing professional versus junk news & disinformation sources, our analysis draws from a sample of 830 sources of news and information that are reporting on COVID-19. We review key search engine optimization (SEO) metrics, as a means of assessing sites' online reputation, and their reliance on advertising. We find that:

(1) The top junk news & disinformation sources achieve outstandingly high key SEO factors and are slightly better optimised for distribution on search and social media.

(2) Major high-prestige, high-trust sites inadvertently boost junks news & disinformation promoting their online reputation and visibility.

(3) The overwhelming majority of junk news & disinformation domains rely on major advertising platforms to monetize their pages and 61 percent of junk news & disinformation sources used Google ads.

INTRODUCTION

In late January 2020, Twitter banned the conspiratorial finance and pseudo-science website Zero Hedge for violating its rules against abuse and harassment after it published an article alleging that a Chinese scientist was involved in engineering coronavirus as a bioweapon. [819]Despite this ban, the article has remained online and is accessible through other platforms without restrictions. As of 24 May 2020, the junk news article was indexed on Google, appearing at the top of search results for "coronavirus bioweapon".

Worldwide, conspiracy theories and junk news science about COVID-19, its origin, spread and treatment are gaining traction among alternative media outlets, extremist internet personalities and populist political figures, and increasingly also among a

broad alliance of citizen and mainstream political actors. [2] As the world struggles to cope with the global pandemic, the viral

spread of digital junk news and disinformation is spiralling into an "infodemic"—a term coined by the World Health Organization—that poses grave risks to public safety. [3] While the spread of this misinformation is commonly attributed to social media platforms, search engines and their optimization processes also play a significant role in this process, and one which has not hitherto received equal scrutiny.

Under the glare of the Cambridge Analytica scandal and reports about election interference, social media platforms—especially Facebook and Twitter—have come under extensive public and government scrutiny. [4] While search engines and advertising platforms have also come under fire for their role in peddling junk news and conspiracy, this has arguably been to a lesser extent than their social media counterparts. The weaker scrutiny of search engines in comparison to that focused on social platforms is reflected in a lesser response from these entities. Unlike on Facebook and Twitter, Google does not provide any report buttons or fact-checker notices for search results.

Search engines play a major role in determining what content users find and access online. With over 3.5 billion search queries executed every day and an estimated market share of over 90%, Google dominates search on the global internet and has become critical to how users access information worldwide. [5], [6] That also holds true for news and public health information: recent analysis by the platform itself shows that global search queries around COVID-19 have surged substantially. [7]

Google has been criticized for repeatedly serving up biased and misleading search results and driving traffic to junk news sources, which in turn can be monetized through advertising. [8] The platform has launched a host of measures tasked with curbing the spread of disinformation—including some specifically tasked with combating the spread of COVID-19 falsehoods. In a blog post, Google states that its ranking system "serves as a strong defence against misinformation", including false articles relating to COVID-19. [9] Despite Google's global dominance, little information about its search and ranking algorithms is available publicly and regulators have demanded more transparency and accountability. [10]

While the exact mechanisms of search algorithms have remained opaque, a whole industry, search engine optimization (SEO), helps websites improve their discoverability and performance in search results. SEO techniques have become widely adopted in digital marketing and have an array of legitimate uses. However, these tools have also been abused by bad actors to enhance the prominence of junk news in search results with the goal of driving traffic to their sites and, in turn, generating revenue through digital advertising. [11]

As people around the world turn towards search engines to access information about COVID-19, it is important to understand why and how users are being exposed to junk news content. In addition, the role of search engine optimization and revenue strategies in the spread of COVID-19 junk news demands further investigation. In this memo, we ask:

- How do the search engine optimization strategies of professional news sources compare to those of junk news & disinformation sources?
- In what way do third party sites boost the online reputation of junk news and disinformation on COVID-19 through backlinks?
- How and to what extent do major advertising platforms monetize junk news & disinformation around COVID-19?

Our findings are:

(1) The top junk news & disinformation sources achieve outstandingly high key SEO factors and are slightly better optimised for distribution on search and social media.

(2) Major high-prestige, high-trust sites inadvertently boost junks news & disinformation promoting their online reputation and visibility.

(3) The overwhelming majority of junk news & disinformation domains rely on major advertising platforms to monetize their pages and 61 percent of junk news & disinformation sources used Google ads.

METHODS

The objective of this study is to offer a real-time snapshot into the digital marketing ecosystem supporting the spread of COVID-19 related junk news on the web, specifically the role of search engine optimization and advertising. We examine how junk news sources optimize their sites for search algorithms to drive traffic to their sites and generate revenues through advertising.

For this study, we performed a domain-level analysis of 830 individual domains publishing news and information about COVID-19. The majority of the domains in our sample were drawn from the Oxford Internet Institute's existing directory of domains that were shared during the US Election 2016, the US Midterm Election 2018, and the EU Election 2019. Detailed accounts of the methodology used for compiling the directory of news and information are available and the OII researchers' methodology has been peer-reviewed multiple times. [12]–[14]

To this set we added sources publishing content on COVID-19 that were checked as false by reputable, third-party fact-checkers: AFP Factuel, BBC Reality Check, Correctiv, Les Décodeurs, dpa Faktencheck, FactCheck, Media Bias/Fact Check, Newsguard, Pagella Politica, PolitiFact, Tagesschau Faktenfinder, Snopes. A small set of six sources pointed to known anti-vaccine conspiracy pages publishing junk news about COVID-19. The provenance of all domains considered in this study is set out in the methods supplement available here.

Of these 830 active domains, all domains had published on coronavirus as recently as in April 2020. A piece of content was classified as relating to COVID-19 when it referenced the term "covid" or "corona*virus" in the headline or text.

Based on a peer-reviewed, grounded typology developed by the Project on Computational Propaganda, we distinguish between two categories of sources of news and information: *Professional news*, on the one hand, and *junk news & disinformation* on the other hand. Professional news sources are major news brands, local news sources and new media and start-up publications which display the qualities of professional journalism, including transparency about real authors, editors, and owners and conduct fact-checking. Tabloids are not included in this category. A source was labelled as junk news when it failed on at least three out of five criteria: professionalism, style, credibility, bias, and counterfeit. Here, junk news sources and sources flagged as false by fact-checkers comprise the category junk news & disinformation. Accounts of the peer-reviewed methodology used include information about the development of the grounded typology and classification of individual domains. [12]–[14]

Following this methodology, our team classified 555 professional news sources and 275 junk news & disinformation sources based on a peer-reviewed, grounded typology developed by the Project on Computational Propaganda. A total of 7 domains from our set of professional news sources were flagged by fact-checkers for publishing at least one false story about COVID-19. Because professional news domains typically publish credible content, remove, retract and correct false information, sources that were withdrawn from these domains were removed from our data sets.

To analyse the search engine optimization and advertising of these 830 domains, we performed automated data gathering for the following data points relevant to this study:

- From commercial SEO tool SEMrush: domain authority, backlinks. (see glossary below for definition)
- From page content headers: Google search mark-up, Facebook mark-up, Facebook App ID, Twitter mark-up. (see glossary below for definition)

We identified the top 100 junk news & disinformation domains and a control set of 100 professional news domains for comparison across different SEO key factors, namely, domain authority and number of backlinks. Domain authority is a comparative, multi-factor metric describing the online reputation of a website that is common in the SEO industry. A backlink is an inward hyperlink from another webpage to a domain. When a backlink comes from a reputable third domain, it can improve a site's domain authority.

To identify the top 100 domains for both SEO factors, we first calculated each site's rank for domain authority and on the number of backlinks, individually. The first rank was assigned to the site with the highest domain authority or highest number of backlinks, respectively. Sites were ranked ordinally. Lastly, we calculated the average rank for each site based on its rank on domain authority and backlinks.

Here, we use the SEMrush domain authority is a proprietary, multifactor measure. Moz, AHRefs and Majestic SEO also produce conceptually similar metrics, with differing results. However, the purpose of using a single measure, in this case SEMRush, is its comparative value, between the domain names in this study.

Sources highlighted as false by fact-checkers included some mainstream tabloids (*Daily Express, Daily Mail*) and several state-sponsored Russian websites (*Russia Today* and *Sputnik*). For comparisons in this study, we removed tabloids, news aggregators, and social media sites. Our domain authority and backlink analysis focused only on second level domains. A second level domain is a domain name registration under a top-level domain (e.g. .com, .uk), for example google.com.

The domains were processed for authority on an incremental basis when new sets were identified for this study. The first domains were analysed in the first week of April and on 16 April 2020. After checking for anomalies, the domain authority and backlinks analysis was rerun on 23 May 2020.

Advertising platforms sell advertising space on domains to various advertisers. In turn, the domain that displays an ad receives money from the advertising platform, for example when a user clicks on an ad displayed on their site or purchases an advertised product. An exploratory, manual analysis of advertising platforms was performed during the period from 16 April to 23 May 2020. Using DuckDuckGo's ad blocker to identify the advertising platforms on a domain's home page, the top 100 sources of professional news on the one hand and junk news & disinformation on the other were accessed and recorded manually. We did not control for browser settings or history.

Glossary of terms

Term	Explanation
Backlink	An inward hyperlink from another webpage to a domain. A backlink from a reputable third party can help to improve a site's domain authority.
Domain authority	A comparative, multi-factor metric to describe the online reputation of a website that is common in the SEO industry. The higher the score (1-100), the higher is a website's search rank is likely to be.
Follow links	A follow link is a type of backlink that instructs search engine crawlers to follow a link to its target URL, and therefore influences the target website's domain authority.
Mark-up	A standard set of instructions which can be inserted into a webpage, which affects the way the webpage should look and work. This includes hints for search results and formatting on social media.
No follow link	A type of backlink that expressly instructs search engine crawlers not to follow a link. It therefore does not influence a website's domain authority. They were introduced to prevent SEO manipulation through link spamming.

FINDINGS – SEO Analysis

Domain Authority Analysis

Domain authority is a comparative, multi-factor metric to describe the relevance of a website. The higher the score (1-100), the higher a website's search rank is likely to be.

First, we compare the domain authority for professional news sources to those of junk news sources. For our enquiry, we selected the top 100 sources ranked by domain authority from both groups. Our analysis shows that the professional news sources outperform junk news sources on domain authority. The average domain authority for professional news sources is 79 compared to 66 for the junk news set. Thus, when querying a search engine, results linking to professional news sources are likely to be ranked higher in search results than junk news sources.

Nevertheless, while the domain authority of professional news sites sets a high bar, 82% of the junk news sources in our sample achieve outstanding scores. Industry experts rate domain authority scores above 60 as excellent, signalling a high visibility and excellent SEO performance for junk news & disinformation, albeit at a lower level than professional news sources. [15] [16]

Table 1 provides further insight into the performance in comparison and lists the domain authority of the top performing domains in each set. For instance, the top junk news domain *Russia Today* (rt.com), still achieved the same authority as *Politico* (politico.com), the German daily newspaper *Die Süddeutsche* (sueddeutsche.de), the Italian daily newspaper *la Repubblica* (repubblica.it) and other reputable sources.

Table 1: Top Performing Junk News & Disinformation Domains by Domain Authority Score

Professional News Domain authority		Junk news & Disinformation Domain Authority	
reuters.com	89	rt.com	82
bbc.co.uk	88	SputnikNews.com	79
cnn.com	87	alternet.org	79
nytimes.com	87	breitbart.com	79
theguardian.com	86	ZeroHedge.com	78
wsj.com	86	globalresearch.ca	77
bloomberg.com	85	mercola.com	76
cbsnews.com	85	dailycaller.co	76
foxnews.com	85	wnd.com	75
washingtonpost.com	85	naturalnews.com	75
ft.com	85	truth-out.org	75
elpais.com	84	theepochtimes.com	74
nbcnews.com	83	theblaze.com	74
cnbc.com	83	americanthinker.com	73
spiegel.de	83	infowars.com	73
politico.com	82	jihadwatch.org	73
repubblica.it	82	pjmedia.com	73
lefigaro.fr	82	rawstory.com	73
welt.de	82	cnsnews.com	72
sueddeutsche.de	82	frontpagemag.com	72

Source: Authors' calculations based on data collected on 16/04/2020 and on 23/05/2020

Backlink Analysis

Next, we conducted a backlink analysis. Backlinks are inbound links from one website to a page on another website. There are two types of backlinks, follow and no follow linls. Broadly speaking, search engines consider follow backlinks as "votes" for the relevance of specific page, which in turn results in a boost to a source's domain authority. No follow links expressly intruct search engine crawlers not to follow a link, and therefore do not impact a site's domain authority. Such no follow links were introduced to prevent link spamming.

Here, each link from a website to one of the domains in our sample was counted as an individual backlink. Generally, the more prestigious the domain backlinking to a page is considered by a search engine, the larger the boost. We extracted the top 100 domains by backlinks for professional news and junk news sources. We calculate average rates of backlinks for the top 100 professional news and junk news & disinformation sources. A detailed list of the number of domains for each domain is available in the data supplement.

We find that on average each junk news & disinformation domain received 16 million backlinks, within a range of 149 million (rt.com) at the high end to 419,000 backlinks at the low end (addictinginfo.org). A summary of our findings for the top performing junk news & disinformation domains is available in Table 2.

Professional news sources far outstripped the junk news set, with a range of 3.4 billion (bbc.com) at the high end and 9 million (nouvelobs.com) backlinks at the low end. On average, professional news sources received 151 million backlinks, nine times more than the average for junk news sources.

However, 80% of the junk news domains have more than 1 million backlinks, and more than 30% have over 10 million. Comparing the percentage of follow backlinks which are highly valued in SEO across professional and junk news sources, the junk news set achieved an average of 89% of such follow backlinks. Professional news sources came out slightly behind with 87% of follow backlinks on average.

A full cluster analysis of backlinking domains is beyond the scope of this data memo. Nevertheless, when checking the top sites linking back to the top 10 junk news domains through SEMrush, that the US evangelical site The Hal Lindsey Report accounts for a high percentage of the total backlinks for seven of the top 10, accounting for 80-95%. A full cluster analysis may reveal strategies of known disinformation sites backlinking to each other to help their domain authority.

Table 2: Top Performing Junk News & Disinformation Domains by Number of Backlinks

	Junk News & Disinformation Domain	Number of Backlinks	Percentage of Backlinks that are 'Follow Backlinks'	Top 2 Referring Sites	Number of Backlinks from Referring Site to Target Site	Percentage of Total Backlinks from Top Referring Site
1	rt.com	149 m	92%	positiveuniverse.com	31 m	21%
				hallindsey.com	13 m	9%
2	breitbart.com	144 m	98%	hallindsey.com	85 m	59%
				deutschland-report.de	14 m	10%
3	globalresearch.ca	127 m	42%	questionuniverse.com	73 m	57%
				positiveuniverse.com	14 m	11%
4	sputniknews.com	116 m	84%	tltnews.net	39 m	34%
				positiveuniverse.com	14 m	12%
5	frontpagemag.com	109 m	100%	hallindsey.com	104 m	95%
				anotherdotcom.com	663,000	1%
6	zerohedge.com	81 m	93%	solari.com	42 m	52%
				weatherinternal.com	7 m	9%
7	wnd.com	73 m	99%	hallindsey.com	60 m	82%
				khouse.org	2 m	3%
8	americanthinker.com	66 m	99%	hallindsey.com	49 m	74%
				conservative-headlines.com	2 m	3%
9	dailycaller.com	45 m	97%	hallindsey.com	25 m	56%
				memeorandum.com	5 m	11%
10	lifenews.com	39 m	99%	hallindsey.com	35 m	90%
				christiannewscast.com	502,000	1%

Source: Authors' calculations based on data collected on 16/04/2020 and on 23/05/2020

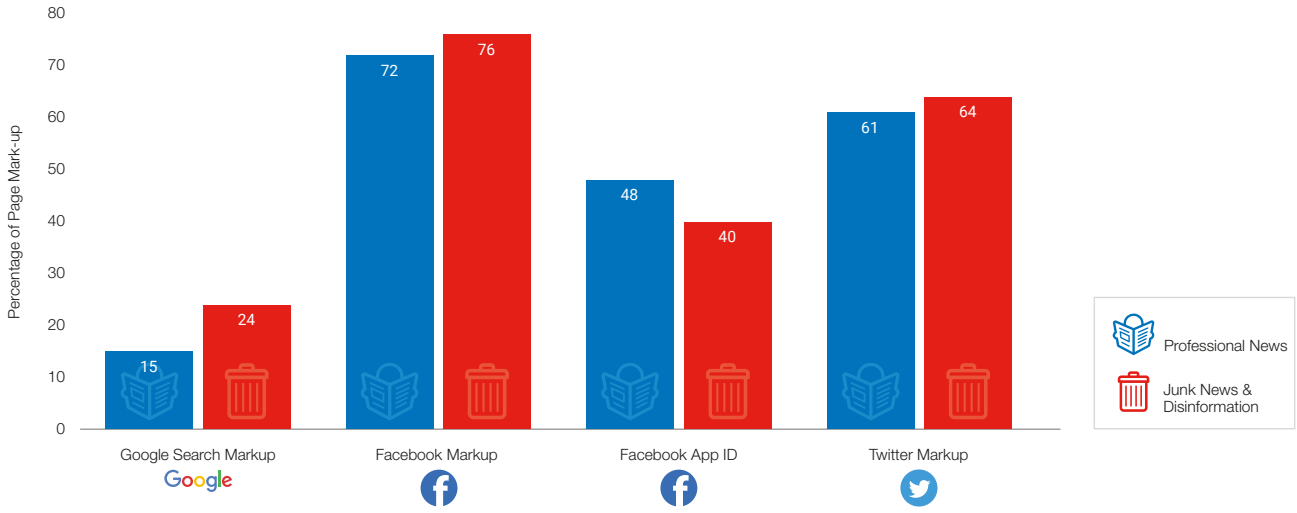
From the top ten junk news domains by backlinks, we selected the far-right, anti-Islam frontpagemag.com for further analysis with SEMRush, as the page with the highest percentage of follow links. The sites' 109 million backlinks were generated by 25 thousand individual domains. Several backlinks came from prestigious sources with a high domain authority, likely resulting in a bigger boost to a site's visibility on search. Four are from .gov domains (namely, senate.gov, nih.gov, house.gov and state.gov—sites with domain authority of between 80-92) and 112 from US academic institutions (including harvard.edu (domain authority 86), stanford.edu (84), Georgetown.edu (76) and berkeley.edu (83). There are 66 backlinks from Oxford University sites.

In most cases the links are many years old, and have nothing to do with coronavirus, but feed into the site's domain authority and thus enhance the spread of current COVID-related junk news. Often, these links are shared as references to research. For example, Georgetown University's Bridge Initiative (georgetown.edu) has 45 backlinks to frontpagemag.com in the context of Georgetown's research into far-right websites which promote Islamophobia. [17]

The same patterns around backlinks from high prestige sites are seen for other junk news & disinformation sources in our sample. For instance, wnd.com receives 73 million backlinks that include 10 from .gov domains (e.g. NASA, 86 domain authority), and 106 .edu domains (e.g. cornell.edu, 83 domain authority), and dailycaller.com generates 45.3 million backlinks, including 32 from .gov sites and from 195 .edu sites.

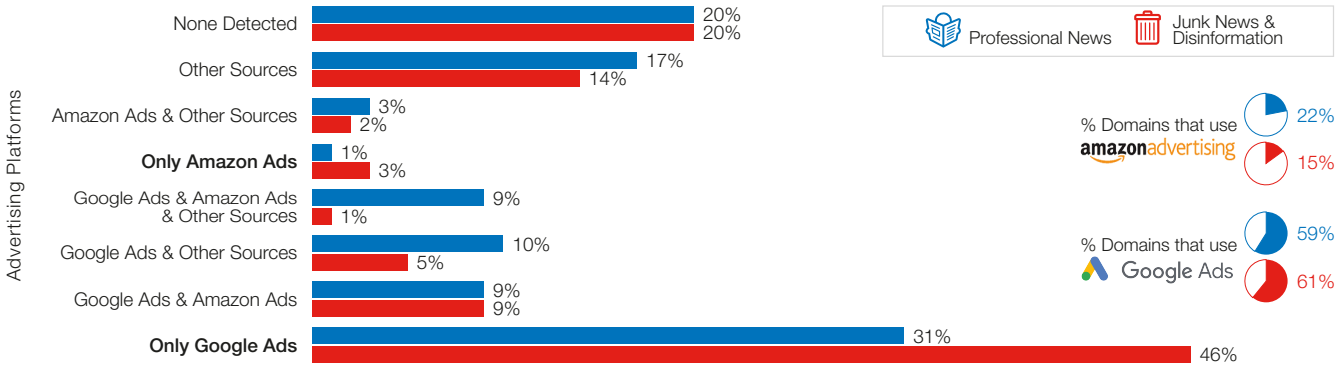
Overall, these high authority backlinks account for only a fraction of the total backlinks to junk news domains in our sample. Additionally, the impact these backlinks have on a domain's search rank cannot be quantified as proprietary algorithms remain confidential in order to protect trade secrets and limit the capacity for their abuse. Heuristically, however, SEO experts postulate that high authority backlinks, even in small numbers, are linked to improvements in the target's domain authority score. [18]

Figure 1: Presence of Page Mark-up on Professional News versus Junk News & Disinformation Domains



Source: Authors' calculations based on data collected on 16/04/2020 and on 23/05/2020.

Figure 2: Advertising Platforms Providing Ad Space on Professional News versus Junk News & Disinformation Domains



Source: Authors' calculations based on data collected on 16/04/2020 and on 23/05/2020

FINDINGS - Advertising Analysis

Mark-up optimisation

For the next step in our research, we examined the role of mark-up on professional news domains and junk news & disinformation domains for the total dataset of 830 sources using a simple script. Mark-up refers to generic code fragments embedded on websites which provide information about what a website should look like and function. Here, mark-ups include information for search engines and social media pages, for example about formatting. In turn, mark-up can optimise a domain's performance on search and social media. In some cases, the mark-up is developed by major platforms to help sites enhance traffic to their site. For our analysis, we analysed mark-up optimised for Google search, Facebook, Facebook App ID and Twitter.

Figure 1 compares the percentage of sites in the professional and junk news & disinformation sets which contain the specified mark-up. The junk news & disinformation sources generally perform better than the professional sites on mark-up for search and social media platforms. The exception is Facebook App ID mark-up, where the professional sites outperform the junk news sites (48% to 40%). This finding suggests again that junk news & disinformation sources actively use SEO to push their performance on social media and searches—on which their visibility, traffic and income depend. Usually, the more clicks a website can attract, the more advertising revenue it can generate. Thus, SEO is geared towards increasing both a site's visibility and revenue.

Advertising Platforms

Finally, in Figure 2 we assess the platforms serving display ads on the top 100 professional and top 100 junk news & disinformation domains in our data set. Advertising plays an important role in monetizing and economically incentivizing the junk news & disinformation ecosystem. Enhancing SEO improves search ranking, which in turn increases traffic to a site.

Our team manually reviewed each domain for the presence of ad space on the domain homepage from different ad platforms during the period from 16 April to 23 May 2020 using DuckDuckGo's ad blocker which automatically detects advertising platforms hosting ads on each site.

We find that both the professional and junk news set show a high use of advertising—across both sets 80% of domains use advertising. Hence, both professional news and junk news & disinformation domains use advertising to monetize their operations to a high extent. The most popular advertising platform across both sets was Google. More than half of the ads on professional and junk news & disinformation sites are provided by Google: 59 percent of professional news domains and 61 percent of junk news & disinformation domains used Google ads. Amazon came in second place but was far less common than Google ads. 22 percent of professional news domains and 15 percent of junk news & disinformation domains used Amazon ads. The most popular other ad platform is Adobe.

Domains do not automatically receive revenues from ad platforms for hosting ads on their site. For some ads, a domain only receives revenues when users click on an ad. For others, the user needs to purchase an advertised product after accessing it through an ad. Thus, the presence of ad space provided by advertising platform reveals potential sources – the advertising platforms – of advertising revenue.

CONCLUSION

The ecosystem of junk news & disinformation around COVID-19 is enabled by search engines and advertising platforms that contribute to their visibility and financial revenue.

Sites that consistently publish junk news, including harmful stories relating to COVID-19, show professional SEO strategies tasked with disseminating their content through search engines. They have high levels of domain authority, meaning that their content will rank high in search results for popular keywords.

What is more, they have high levels of backlinks, and of valuable follow backlinks. Our analysis indicates that leading government and academic institutions are not sufficiently careful with their backlinks and may be unwittingly lending junk news sources their online institutional reputation, further enhancing the visibility of those junk news sites.

Advertising revenue is a major source of income for news outlets, both for professional news and junk news & disinformation domains. Many of the sites in our sample have been flagged by researchers and fact-checkers for carrying conspiracy theories and falsehoods, including in relation to COVID-19. Yet, these sites continue to generate revenue from advertising. Large advertising platforms, including Google and Amazon, therefore contribute to the financial viability and success of junk news & disinformation publishers around COVID-19.

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ABOUT THE PROJECT

The Computational Propaganda Project (COMPROP), which is based at the Oxford Internet Institute, University of Oxford, involves an interdisciplinary team of social and information scientists researching how political actors manipulate public opinion over social networks. This work includes analyzing how the interaction of algorithms, automation, politics, and social media amplifies or represses political content, disinformation, hate speech, and junk news. Data memos integrate important trends identified during analyses of current events with basic data visualizations, and although they reflect methodological experience and considered analysis, they have not been peer reviewed. Working papers present deeper analysis and extended arguments that have been collegially reviewed and engage with public issues. COMPROP's articles, book chapters, and books are significant manuscripts that have been through peer review and formally published.

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