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The quality and variety of information in the digital and traditional media: Competition and complementarity

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ABSTRACT

In recent years the internet and social media have established themselves as primary sources of information and have become an integral part of political communication. The speed with which news is published and circulated, and the possibility, especially with mobile devices, of consuming information from anywhere, even while involved in other activities, have caused the internet to become central to many current events. It's increasingly important to question the quality and variety of the information that's available online. This is the topic that's becoming more and more central to political debate because, as is also true for traditional media, making accurate information available is one of the essential conditions not only for being able to choose the best products and services in several markets, but for making informed political choices as well. Therefore, proper functioning of the information market has important externalities which affect both the political system and the proper functioning of many financial sectors. After decades of expansion in information markets, it's clear that a simple quantitative increase in the amount of information available isn't enough to prevent individuals from being insufficiently or poorly informed, and it rather introduces issues regarding the trustworthiness, quality, and relevance of the information.

KEYWORDS: digital news, algorithms, commercial and editorial information, disintermediation, hard news and soft news, newspaper decline, economy of scale, entry barriers in information markets, internet, digital platforms

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1. INTRODUCTION

In recent years the internet and social media have established themselves as primary sources of information and have become an integral part of political communication.

The speed with which news is published and circulated, and the possibility, especially with mobile devices, of consuming information from anywhere, even while involved in other activities, have caused the internet to become central to many current events.

According to AGCOM's data, 62% of Italians use the internet for news about international, national, and local affairs, as compared to 74% who get their news from television (which remains the primary source of information), 56% from newspapers, and 25% from the radio. Despite the fact that surveys of this kind are very sensitive to the way questions are posed and encounter the usual problems associated with self-reporting, in which individuals tend to overestimate the consumption that they perceive to qualify, similar values were found in other international surveys as well. In the United States in 2021, more than 50% of the population said that it prefers getting its news from digital platforms, 36% said that it prefers television, 7% radio, and only 5% print. For many years now, the internet has been on the rise while traditional media have been declining, at least in terms of the percentage of the population that considers them its primary source of information. Naturally, the size of consumption differs. Each day individuals watch an average of more than half an hour of news-related content on television (until now the primary source of information in most countries) and read the newspaper for an average of twenty minutes. Meanwhile, on the internet, news websites are visited for just a few minutes per day, though in this case, the boundaries are somewhat ill-defined because, for example, part of the time dedicated to social media might in some way qualify as the consumption of information.

In this context, it's increasingly important to question the quality and variety of the information that's available online, a topic that's becoming more and more central to political debate because, as is also true for traditional mass media, making accurate information available is one of the essential conditions not only for being able to choose the best products and services in several markets but for making informed political choices as well. Therefore, the proper functioning of the information market has important externalities which affect both the political system and the proper functioning of many financial sectors.

After decades of expansion in information markets, it's clear that a simple quantitative increase in the amount of information available isn't enough

to prevent individuals from being insufficiently or poorly informed, and rather introduces issues regarding the truthfulness, quality, and relevance of the information being distributed. Economics literature has dedicated little attention to how information is acquired and produced and to the incentives and constraints that characterise the various levels in the information supply chain.

From an economic perspective, the media can be considered as two-sided markets , gathering information for the public on one side, and producing audience for advertisers on the other. If it aims to maximise profits, then it must simultaneously consider the competitive conditions of the two sides in which it operates and the total costs that it must sustain in order to produce sellable information and a sellable audience with the highest possible profit. On television and on the radio, information is disseminated free of charge and all profits come from the sale of advertising slots. In print, advertising has long been considered extra revenue, seen almost as a way to subsidize the primary activity of selling information to readers. However, a lot has changed in recent decades. On the internet, after some uncertainty, the advertising model has been predominantly established, as well as the connection to forms of e-commerce.

In a simplified version of the processes by which information is selected and produced, the media operates by selecting the information that interests readers the most, as accurately as possible and in a way that's compatible with the costs of research and verification. If they operate in this way, they obtains the highest possible number of readers and, in the long run, earn a reputation as a reliable and credible source. If it's successful among readers, then it will produce more contacts to sell in the advertising market. When ti comes to the internet, it's necessary to enrich upon this representation. On the one hand, in fact, large autonomous organisations dedicated to the production of original information, like traditional newspapers, have not yet been developed on the internet. Most of the professional information that's consumed online is produced by traditional media. On the other hand, much of the information that circulates on the internet comes from non-journalistic sources, which include both the direct participation of individuals via "user generated content" and dissemination by various kinds of companies and organisations through communication. This phenomenon is well-established in traditional media through media relations activities, but in the digital context it now finds new forms of development that involve the direct management of social media conversations with clients and the opening of direct communication channels. In addition to presenting and selling products, company websites assume a true editorial role, contributing

to the representation of the company and its products.

Through its activities, the media produces externalities that are positive for society as a whole as they contribute to the creation of an environment that's generally more informed, in which choices are made with more awareness, and the information that's disseminated strategically by politicians and firms (advertising promises, electoral promises, mandatory disclosures in financial markets) can be more easily verified and appropriately contextualised.

In a society that's generally more informed, it's difficult to spread false promises and steer choices on the basis of secondary and irrelevant aspects. Naturally, in order for this to happen, the editorial information that's spread by the mass media must, on the whole, be sufficiently truthful and rarely misleading.

Online there has been an increase in the available sources of information that can be monitored and interested consumers can easily verify a news story by visiting the same source which inspired the journalist. Furthermore, many websites select and disseminate news on specific topics, adding enormous variety to the available information. In theory, switching costs are low, and all it takes is a couple of clicks to go from one website to another. Nevertheless, even on the internet, there's a high degree of brand loyalty, and the leading information websites (often the digital version of traditional media) obtain a significant number of visits and page views.

The internet is becoming THE platform for the distribution of several media and of a wide range of information and news. While traditional media has evolved, occupying a specific position in the information production and distribution supply chain, and offers a relatively stable bundle of news stories, the internet is characterised by informational abundance that can, however, be truly overwhelming to many users. On the internet, both users and information professionals can find very different pieces of information side by side: breaking news stories spread via Twitter or Facebook several hours before information agencies have confirmed and released them, several eyewitness accounts, many different opinions, and comments, news aggregator websites, press releases, and simple links. While in traditional media, stories become news because of a selection process that exists and excludes a portion of the information that's out there, on the internet the over-abundance of information requires a new consumption capacity from users and poses problems that are somewhat different than those of traditional mass media.

2 VARIETY AND AVAILABILITY OF INFORMATION

Observing the dynamic of the number of websites which, over the past fifteen years, have grown at an average annual rate of 25-30% in the world,

there's little doubt that the quantity of available information has increased. At the same time, however, it's possible to observe contrasting dynamics related to, for example, a reduction in the number of journalists in many traditional editorial offices due to the economic crisis and a lack of analogous services created for the internet. Naturally, the globalisation of sources also encourages processes which tend to standardise information. The decrease in traditional media like newspapers, and recently television, leads to a reduction in journalists. For example, according to ASNE, in the United States the number of newspaper journalists dropped by more than 50% between 1990 and 2019, going from 53,000 to 23,000. Overall, the decrease is less pronounced, but according to the Pew Research Centre the total number of journalists has gone down by 28% between 2008 and 2020.

Furthermore, most of the information available online didn't previously fall within the perimeter of traditional mass media. For example, social media now facilitates social interactions that were once basically mediated by personal relationships, and all product information was once only available in brochures or by visiting the store.

In terms of supply, technological innovation has drastically reduced the costs of producing and gathering information, thus lowering entry barriers in this industry. This means that many small operators can produce information at relatively low costs, even though some types, like investigative journalism, continue to require the ability to make significant investments. Furthermore, the digital environment makes it possible to spread information with almost zero marginal costs. Once a website has been built, it no longer has variable costs. There's no need for pen and ink in order to publish, nor networks of transmitters to broadcast a signal. The combination of these factors makes it possible to explore very small and diversified niches of demand which simply couldn't be served before and, furthermore, allows every person and organisation that has an informational spillover of any kind, to become an information source. This drastic reduction in costs is true for every kind of information that exists, from major journalistic investigations to cooking blogs. But the number of non-professional soft news stories, which previously were beneath the minimum threshold for entering the professional media, naturally increase in proportion as well.

The problem is that, while the number of journalists in traditional media is decreasing, the number of distributive solutions in the digital world are increasing, solutions that are able to personalise the informational menu of every consumer. owever productive mechanisms and true editorial offices that are capable of filtering, evaluating, and producing quality journalistic information have not yet been created.

The reduction in distribution costs (practically zero in the digital context) has made it possible for organisations and individuals to connect with many more sources. At the same time, the emergence of global operators, which pose a challenge to traditional national media, can give the impression of standardised information which refers to the same sources from link to link.

The perception of variety is very similar to that which was observed in the retail revolution with the development of large-scale distribution outlets that replaced the much more numerous traditional stores. It's true that in supermarkets the assortment and the brands which are offered are always the same throughout the franchise (the result of economies of scale in purchasing) and that there is, therefore, a reduction in the number of small producers present in the region, but at the same time, the variety of products available to each individual consumer has vastly increased because the single supermarket has a much larger assortment than that offered by an old traditional corner shop.

If anything, the enormous amount of information that's potentially available creates a problem of information overload. In fact, navigating one's way through abundant or excessive information can be just as difficult as remaining informed in a world where information is scarce. What emerges is a need to match information and users, which generates the potential demand for the search engine's services.

3 THE DECLINE OF THE TRADITIONAL MEDIA

The internet's expansion, in terms of both information consumption and other activities related to transaction and social interaction, corresponds with a reduction in the consumption of traditional mass media, whether we're talking about the information market or the advertising market. The two phenomena are clearly related, given the two-sided nature of the international media market and the externalities in the demand which connect them. Therefore, for example, a decline in the advertising market influences the production and distribution of information and thus accentuates a decline in the informational component as well.

In the advertising market, the internet replaces all other media. I've created an econometric model based on the investments, per type of media, of all domestic Italian advertising investors (approximately 100,000 companies) over a period of 6 years, which demonstrates how the cross-price elasticity of internet demand with respect to all the other means of advertising is always positive (Gambaro Puglisi, 2013), even if the degree of substitutability for newspapers it is rather high and for other types of media is relatively modest.

A major reason for this substitutability is the average lower price of the

internet due to relevant economies of scale and zero marginal cost, when it comes to the production of contracts. For the American market, Varian (2012) reports prices per thousand contacts that are approximately ten times lower than those of traditional media. This is due in part to the lower cost of processing digital information, in part to the very low marginal costs which internet operators have, and in part to the enormous availability of space which encourages one to choose a low-price and high-volume strategy in order to maximise profits.

In terms of information markets, various studies demonstrate how digital information is tending to replace traditional media, and also how, in part, people dedicate more time to this new platform than they do to traditional media consumption. When it comes to television, Liebowitz (2014) finds that the proliferation of the internet has had no significant statistical effect on the television consumption of individuals over 35 years old, while its econometric model for the United States market reveals a degree of substitutability among the younger generation. Despite the spread of the internet, television consumption has remained stable in most European countries, or it is even slightly on the rise with respect to the average four hours per day per individual, an amount of time that remains overall greater than that dedicated to the internet, even though the latter has a generalist infrastructure with numerous user functions. Naturally, with the Covid-19 pandemic, many of these trends have been intensified, and the consumption of digital platforms has increased, also due to forms of telecommuting and distance learning which have helped to further familiarise many consumers and individuals with digital tools.

For newspapers, a more accentuated substitution process took place which has facilitated and accelerated the decline that the sector has been experiencing in recent years in both the editorial and advertising markets. But the replacement is more related to the digital environment as a whole than to specific platforms. Google and Facebook don't directly replace the consumption of information via traditional media, and many studies actually indicate that they serve more as complements than replacements. The traditional interpretation according to which digital platforms make profits with information produced via traditional media, doesn't seem to be supported by scientific analysis. On the contrary, it seems that the opposite is true. Most people's access to newspaper websites comes from Google and Facebook.

In terms of advertising, competition from other media has a substantial influence, as does the long recession we've just experienced, which reduced the inclination of companies to invest in advertising. The competitive pressure of the internet is particularly significant in its ability to apply lower prices,

this thanks to the extraordinary economy of scale of major global operators, the ability to precisely define target market segments and the flexibility that allows it to serve as both national and local media.

In a group of 10 western countries for which WAN (World Newspaper Association) data exists over a period of 10 years, the percentage of newspaper advertising revenue out of the total revenue was halved, dropping from almost 29% to less than 14%, a significant decline that, in various countries, has transformed newspapers from a fundamental element of advertising plans to a complementary one.

Over the same time period and in the same countries, internet advertising revenue generally grew at an annual rate of more than 15%, tripling in value over a period of 10 years, within an advertising market that overall, has been shrinking.

Traditional publishers also operate in the internet advertising market through the digital versions of newspapers and television channels, however, these forms of media represent a much smaller portion of internet advertising as a whole. After several years, in Italy, these websites stopped growing. Contrary to what was expected, the simply transition to digital technology does not seem to represent a way out of this crisis for newspapers. For every reader that becomes an internet "surfer", a newspaper loses approximately three-quarters of its revenue from that reader, and as a result, its fixed editorial costs cannot be recovered.

Looking at the percentage of the total advertising revenue that comes from newspapers and the internet (See Table 1), one gets an immediate sense of how resources have been transferred from one type of media to the other, even though the other classic means of advertising have also experienced a drop in revenue in all of the countries in question and, in many others, the drop in newspaper revenue corresponds with the growth of internet.

In Italy, the total advertising revenue from classic means of advertising grew from 2.3% in 2006 to 26% in 2015, while over the same period the newspapers' share dropped almost 10 points, from 18.6% to 9.3%.

Table 1. SHARE OF ADVERTISING REVENUES FOR NEWSPAPERS AND INTERNET IN SOME COUNTRIES

Country	Channel	2005	2007	2009	2011	2013	2015	2017
Canada	Newspapers	28.5%	26.4%	21.4%	18.2%	15.0%	10.3%	8.8%
Canada	Internet	9.8%	12.8%	19.5%	24.6%	30.5%	40.3%	43.8%
France	Newspapers	12.2%	11.2%	10.5%	9.7%	8.0%	6.8%	6.2%
France	Internet	10.5%	18.0%	21.3%	24.9%	28.9%	32.3%	35.6%
Germany	Newspapers	37.8%	35.8%	33.1%	30.3%	26.0%	23.5%	22.5%
Germany	Internet	8.3%	13.3%	17.1%	20.6%	27.9%	32.0%	34.2%
Italy	Newspapers	18.6%	16.9%	15.0%	12.7%	10.1%	8.2%	7.5%
Italy	Internet	2.3%	8.1%	11.4%	19.1%	24.9%	27.3%	29.3%
Netherlands	Newspapers	35.7%	33.0%	27.7%	22.1%	16.7%	12.8%	11.2%
Netherlands	Internet	13.4%	17.8%	24.2%	30.6%	37.5%	43.0%	46.4%
Norway	Newspapers	42.5%	44.5%	40.0%	35.3%	29.9%	19.1%	16.4%
Norway	Internet	13.5%	22.6%	27.0%	30.1%	36.5%	46.9%	49.3%
Poland	Newspapers	12.5%	9.7%	7.4%	5.6%	3.5%	2.2%	1.8%
Poland	Internet	3.7%	9.5%	13.8%	17.9%	22.3%	26.2%	28.7%
Spain	Newspapers	26.2%	22.7%	20.4%	17.7%	14.6%	12.3%	11.2%
Spain	Internet	4.2%	8.6%	13.6%	19.0%	24.2%	27.4%	28.9%

Source: WAN

Country	Channel	2005	2007	2009	2011	2013	2015	2017
Sweden	Newspapers	42.8%	37.3%	33.8%	27.9%	21.2%	14.6%	11.5%
Sweden	Internet	15.1%	22.4%	26.8%	33.2%	42.6%	54.6%	59.8%
USA	Newspapers	29.7%	25.8%	19.5%	15.4%	12.1%	9.6%	8.4%
USA	Internet	6.4%	10.7%	15.5%	19.4%	24.8%	31.7%	35.1%
Source: WAN								

In terms of circulation, competition from forms of electronic communication and the expansion of free information on the internet is significant, as are the changes in consumers' usage habits.The decrease in the number of copies isn't simply connected to their replacement with other types of media, in particular, the internet and, in the past, televised information. The dynamic appears to be more complex. A newspaper can be thought of as a bundle of different news assembled together, of which every reader, despite purchasing the entire product (the newspaper) consumes only a portion (some articles). The information that's distributed is very diverse and includes national news, local news, stock prices, editorials, theatre reviews, and service information, like movie times. In the 25 minutes that readers on average dedicate to the newspaper each day, they read only a portion of the articles. As often happens in this situation, the equilibrium is based on the complementary nature of the various elements in the bundle (in this case the various kinds of information contained in a newspaper). If, because of digital innovation, certain secondary elements in the bundle (like small advertisements or movie times) are available for free online, then the entire bundle can collapse, and the number of copies sold can decrease dramatically. Marginal readers may no longer find it worthwhile to purchase the newspaper for its cover price and as a result, their information consumption may change slightly. In fact, the drastic decrease in the number of copies sold occurs even in the absence of digital products that are fully able to replace all functions of a newspaper, and that can be considered proper substitutes.

After all, newspapers, like all journalistic editorial products, have very high fixed costs to produce the first copy and relatively low marginal costs for the publication of each additional copy. Competition forces newspapers to calibrate their fixed publishing costs on the basis of sales predictions according to Sutton's endogenous model of sunk costs. But given that the dynamic of

fixed costs has some inertia when the market is growing, it's possible to earn high profits by slightly delaying adjustments to the fixed costs with respect to the predicted sales. In return, when the market is shrinking it's necessary to rapidly reduce the fixed costs, which otherwise quickly become disproportionate and raise the average unit costs to a level that generates significant losses. But reducing fixed costs means essentially recalibrating the editorial team, which therefore also reduces the quantity and the quality of the information being produced. This can, in turn, accelerate the breaking of the bundle and a further drop in the number of copies. It is indeed a vicious circle, and it is almost inevitable because a newspaper cannot sustain fixed costs tied to its larger past size. The only possible solution is to redefine a new bundle for which it's possible to establish a new equilibrium between costs and revenue.

4 THE QUALITY OF INFORMATION

It has often been observed that the quality of the information available online is lower than that provided by traditional media. This observation refers to a series of differing phenomena.

First of all, traditional media has stringent space restrictions that are vastly inferior to the amount of news which is actually available every day. An average of 250 articles are published in a newspaper daily, against the 4,000-5,000 news stories launched by agencies in Italian, plus all international sources as well. In an Italian television news program lasting 22-25 minutes, there are generally 16-18 video reports and 4-5 voiceovers. On the internet, such space restrictions don't exist, and therefore, in one way or another, it's possible to find all news stories and insights that are available.

It's probably true that on the internet soft news, oddities, rumours, and gossip outweigh political information based on research and reporting. The fact that, with technological innovation, the cost of producing and disseminating information has drastically decreased, thus reducing the economies of scale considerably, plays an important role. News stories that previously wouldn't have reached the market, now do. This leads to two observations. Soft news stories play an important role also in traditional media: television entertainment, reality shows, soap operas, and sports take up most of the programming. Even newspapers are made up of more than just political news stories and articles, with a strong foundation of local, often light, information about sports and services, not to mention, of course, tabloid newspapers, that are focused almost entirely on soft news. Furthermore, the impact of soft news on influencing public opinion is wrongfully underestimated. In a recent study, Durante Pinotti and Tesei (2017) demonstrated how the consumption of entertainment programs on Mediaset television stations had had a political

impact. Those people exposed first to commercial television were more likely to vote for Forza Italia in the 1994 elections, and this effect persisted for the five subsequent rounds of elections, especially for very young individuals and for the elderly.

Thirdly, while most of the information available online falls in the category of soft news, this doesn't mean that the hard news and in-depth information that's available hasn't increased with respect to traditional media. The enormous reduction in the cost of distributing information allows many producers to distribute their content, also to producers of qualified information.

Finally, a portion of the soft news stories and much of the digital gossip that takes place on social networks were once simply excluded from the information pool, confined instead to other contexts of socialisation: bars, clubs, and groups of friends.

A relevant problem that has emerged in recent years and that has exploded with the pandemic and with the invasion of Ukraine, is that of fake news. In general, this refers to false or misleading information masquerading as legitimate information and that many people believe to be pervasive and pose a risk to peaceful coexistence and democracy. Indeed, during the Covid-19 pandemic, false information about the origins of the virus and about the possible side effects of the vaccine were widely circulated in order to defend and strengthen the anti-vax position. In a famous article, Allcot and Gentzkow analyse the impact of fake news on the 2016 presidential election in the United States and verify that both its spread and impact on voters (prevalently pro-Trump) were relatively limited. Naturally the term "fake news" describes vastly different kinds of information, ranging from false stories that serve as clickbait and therefore attract advertising investments built around a primarily financial objective, to conspiracy theories spread for ideological reasons, to widespread political instruments meant to modify power relationships and individuals' orientation towards certain political parties or countries. The connection to social media is particularly problematic. On social media platforms, content can be shared between users at lightning-fast speeds without any significant filter by independent third parties, fact-checking, or editorial review. In the same way that in traditional media outlets professional tools and culture have been developed over the years, which favour objectivity and provide mechanisms for verification. So the issue of fake news on the internet will require a combination of regulatory policies, technological innovations, user education, and fact-checking too.

5 DISINTERMEDIATION AND THE EVOLUTION OF JOURNALISM

Disintermediation is one of the most important trends in the digital

environment where specific professionals, like journalists, play a smaller role in selecting and producing information. Much of the information that circulates online is produced directly by users or organisations whose primary activity is not that.

Not only do journalists produce only a small portion of the information present online, but their exclusive authority is questioned. An interested consumer can easily verify a news story by visiting the same sources which inspired the journalist's article. This can actually develop into a genuine fact-checking activity performed from the ground up which made it possible to verify that an article by the London correspondent of *Corriere della Sera* had been copied, without giving credit, from the *Financial Times*.

In some rare cases, the information produced by amateurs is qualitatively superior to that produced by journalists. For example, in the coverage of unpredictable current events taking place in real-time, people who are witnessing the event first-hand can, with a simple smartphone, send videos and provide testimony which, if properly organised and edited, allow for better coverage than that of a professional from a distance. Or, in instances where considerable expertise in a specific sector is required, an expert from that sector is often able to provide a better overview than a journalist.

In this context, not only do journalists participate less in the news flow, but they find themselves facing new problems related to the management of this flow and must therefore modify the structure of their professional activity. While some routines of production remain valid, like the verification of a news story from two independent sources, the relationship with these sources' changes substantially. Journalists tend to become experts in the flow of information, capable of selecting news stories and leads from dozens of websites, verifying the credibility of a source based on contextual elements, and agilely navigating through the viral reproductions of true and false news stories. They are more traffic and network experts, able to quickly verify and fact-check information, than traditional gatekeepers or producers of news.

Many organisations build a high-quality flow of information by taking advantage of and organising user-generated content. UGC implies the production of information provided without direct compensation and can be qualified as the private supply of public goods. Various economic issues are related to this trend, reminiscent of those that came up with open-source-software. First of all, why do users contribute their knowledge and work for free to produce information? One possible motivation is that of showcasing their skill for professional opportunities in the future. In fact, many successful bloggers subsequently receive paid positions and obtain stable positions in the media system. A second possible explanation has to do with externalities

and the spillover generated by the act of spreading information, perhaps connected to the sale of complementary products or the promotion of other related activities.

Looking at the production function can also be important. If I'm an expert and have exclusive information that I can't take advantage of in any other way and my production costs are very low, then I can share this information, also without compensation, in the hope of reaping future potential benefits.

A second economic question is how it's possible for a platform to keep the qualitative level of information high and prevent opportunistic behaviour in a non-professional context that lacks contractual incentives. This is a common problem for blog websites or those which collect reviews of hotels, restaurants, or other users. Many forums, or websites that are open to the contribution of all their users, receive a lot of spam, false advertising, or merely useless contributions. If the publisher could measure, without a cost, the quality of the contributions, then the entire problem would rapidly become a simple issue of production planning. But on the other hand, if a publisher doesn't make a significant monetary investment in its selection of content, then a consumer can make a contribution that has a negative value for the publisher.

While in traditional media firms the structure of the production process and professional and ethical norms guarantee both quality and error correction, in the digital landscape we see different outcomes. For example, in collaborative contexts like Wikipedia, it has been possible to achieve a level of quality which exceeds that of the best traditional encyclopedias thanks to the continuous revision of entries by a multitude of experts without editorial participation, except for a few critical topics. Various trials have demonstrated that the thoroughness and pertinence of Wikipedia's entries are comparable, if not superior, to those of professional publications like the Encyclopedia Britannica. It's no coincidence that traditional encyclopedias have gradually left the market. Only in particularly controversial pieces, in which opposing factions compete to publish relevant pieces, has editorial moderation of the contributions proven to be essential.

On the other hand, however, the same phenomenon of continuous and rapid informational interactions has more recently amplified the phenomenon of fake news, rumours, and slander that are widely disseminated thanks to viral sharing on social networks and that, obviously, represent a deterioration in the quality of the informational environment. The large number of clicks that can be obtained has created a (fraudulent) business opportunity. A person can create a website with one or more pieces of fake news that, through their viral growth, attract clicks and are further shared. He or she collects advertisements for several days and then closes the website before fact checkers determine

that the news was fake, and the page is removed from the platform. The speed of dissemination makes it possible to earn several thousand euros in just a few days which, for unscrupulous young individuals, is a coveted reward.

6 THE LINE BETWEEN COMMERCIAL AND EDITORIAL INFORMATION

In the world of traditional media there has always been a red line, featured in many deontological debates, between advertising and editorial information. It's normally assumed that journalists and editorial offices seek and select information according to the interests of their readers and without being subjected to commercial or political pressure. If a journalist allows himself to be influenced by advertising in his production of information, then in the long term he lowers the value of the newspaper as a source, but in the short term, he may increase the newspaper's revenue or make some extra money himself. As newspapers have limited space, given the positive effects of communication, organisations compete tooth and nail to see news about themselves published.

Over time organisational routines have been established, like the separation between the advertising staff and the editorial staff and the application of deontological norms, that should solve this problem. Even though these tools don't always work, if nothing else they serve as a reference point which in the digital environment, characterised by a fluid publishing industry, doesn't currently exist.

Naturally, in traditional media, deontology and organisational solutions are not enough to contain the forces at work. Together with Riccardo Puglisi, I examined the journalistic behaviour of 6 Italian newspapers with respect to 13 listed companies over a period of two years. Analysing 52,000 articles, all press releases from these companies, and the monthly advertising investments of each company per newspaper, we verified, in an econometric model, that once all factors were considered, additional investments in advertising were associated with additional journalistic coverage. Furthermore, after a press release, it's more likely that there will be an article about a certain company, but this probability increases as the advertising investments of that company in a specific newspaper also increase.

Online the interaction between commercial and informational components is even closer and more ambiguous. Furthermore, often even just the idea of a separation and the understanding of how it could be enforced is completely missing. Much information is produced and selected in non-journalistic environments that don't adopt, and often aren't familiar with and don't recognise, the deontological rules governing the separation of functions.

When forums were first developed, it was common for public relations

insiders to participate, disguising their role and surreptitiously promoting a solution or product. The negative impact on the image of large consumer groups, which occurred when this practice was discovered, led to its deceleration and to the establishment of a set of deontological rules between public relations offices.

For celebrities and influencers, it's a common practice to receive payments for tweets or posts on Facebook which, with the excuse of talking about their personal lives, mention certain products and their fondness for them. Informal, but well-established rates based on the number of followers or likes, exist for these kinds of practices. For bloggers, the distinction between genuine comments and sponsored references is practically non-existent. Indeed, achieving a connection with brands represents an element of recognition and is an indication of success.

On the other hand, companies become direct producers of content, both through the management of social media accounts by company representatives and through the creation of journalistic-type content on the company websites, like nutritional information for food products and medical and health information for pharmaceuticals. In this case, the credit and the source aren't hidden, but the journalistic quality is higher, and the disintermediation process continues.

Even though these dynamics are more documented in the commercial world, in the world of economic and political information as well many organisations (like research centres, associations, advocacy groups, and communities of experts) come together downstream to directly produce newsletters, reports, and press releases which, on the one hand, provide a source for journalists and information websites, and on the other are the direct product of the users. The issue of partisanship in this kind of informational context varies considerably, as does the quality of the information that's produced. Sometimes the orientation is obvious, while at other times a position within a research centre can conceal an orientation towards a certain political party.

As far as the commercial aspect is concerned, the United States FTC, as well as other regulatory authorities, is taking the approach that when any reference to a product is made for commercial purposes and with any sort of remuneration, even in kind, it must be made explicitly clear in the communication. While this principle of disclosure seems reasonable, it's possible that in certain situations, such as for the most famous bloggers, it's of little value.After all, we know little about consumers' sensitivity to informational bias and their ability to recognise it.

It's interesting to observe how the majority of (more or less specialised) information websites present on the internet derive most of their revenue

from forms of sponsored communication, infomercials, or company services, while traditional advertising has proven to be insufficient for covering costs.

7 NEW FORMS OF INFORMATION AND THE ROLE OF ALGORITHMS

Technological innovation has produced new forms of information which are difficult to classify, but which perform functions that we're traditionally used to attributing to journalists and to qualified sources of political information.

The most typical case is that of online search. Search engines deliver results based on the interests and information which clients have looked up in the past, and the quality of the search is higher when it's more able to deliver information that's appropriate and pertinent to the intentions of the user.

Google, which is the market leader worldwide, uses an algorithm called PageRank that considers websites from which to draw information valid based on the links that go towards those websites. It performs a publishing and editorial task but in an entirely automated way. Even a journalist or an editorial staff selects available information on the basis of that which they presume will be interesting primarily to their group of target readers. The informational product is of high quality if it provides these readers with the information that they would have looked for and that's relevant to their interests. Naturally, by completing this research in an automated way, the structure of the costs is very different from that of editorial staff and has high fixed costs and almost zero variable costs, with relevant and obvious economies of scale. The availability of all the search data and individual results allow for continuous and low-cost experimentation, something that all digital operators and Google, in particular, do, generating an important learning-by-doing phenomenon. This, together with the cost structure creates high entry barriers, even in situations where the potential competition is significant. In theory, the switching costs for consumers are very low, and consequently, the degree of lock-in is also low: they can change search engines with just a click. But the brand loyalty to major platforms reveals that significant consumer inertia emerged. As often happens with product innovation, differences exist with respect to the previous technology. The possibility to customise and the reservoir of potential consulted sources are much greater than in journalistic selection methods. However, it's more difficult to double-check news stories or judge their relevance, even here breakthroughs in artificial intelligence could have some surprises in store in the coming years.

Other algorithms work in a different way. Facebook, for example, proposes content based on the interests of its users, both declared (like in friend lists) and by way of the progressive selection of information through likes. These selections are in fact made within a proprietary environment and assume a

primarily "push" approach, meaning that they don't originate from an explicit user request.

Likewise, the Spotify algorithm, which selects musical tracks based on the user's preferences, performs a task similar to that of a DJ, only it does so for every single user, thanks to a reduction in the cost of the technology, and not for a more generic group of listeners.

Basically, the choice and construction of the algorithm are editorial tasks, full of informational content and implications, to which, however, the institutional and regulatory apparatus, that over time has been established around journalistic activities, cannot be applied. Conversely, issues come up regarding the capacity to control, know, and market algorithms, because here too strategic choices are possible, as emerged in the dispute between Google and Hachette when, not being able to agree on contractual terms, Hachette's content suddenly slid to the bottom of the search results. In theory, the algorithm was supposed to act autonomously, but clearly someone was able to give it a little push.

Even activities that are typically considered to be distributive, like the sharing of posts or the repackaging of information between different websites, or quotes, comments, retweets, and simple likes, can acquire informational value. A user can be sensitive to the preferences of other consumers and assign value to the information that he or she encounters according to how many other users approve of or enjoy that piece of information. These dynamics are described in the consumer world by the bandwagon effect, developed by Veblen or by models with network externalities. In this case, all these activities, which are purely distributive, change the value of the information, at least for certain categories of users, increasing its credibility or relevance. Therefore, how this dynamics works has everything to do with the way in which the value and relevance of the information available online are created and, therefore, with the quality of the information.

8 CONCLUSION

With the rise of the internet, we've seen the information landscape expand and the sources available multiply. But, at the same time, a process of transformation has begun in the vertical information supply chain, with users getting involved in the production and expansion of activities that once would have been simply described as distribution and matching, like search engines and social networks, but whose informational value must now be recognised also if with sometimes an ambiguous role. As a result, the skills profile required of information professionals, like journalists, has also changed, and even though they no longer hold the exclusive role of gatekeeper, they still

perform the important function of substantially reducing the informational asymmetries present in society.

Many of the problems posed by the internet are new and can represent paradoxes within the context of traditional institutional definitions and structures. But new trends, like user participation, the viral spread of information, and the editorial roles of search engines cannot be eliminated by decree or reduced by institutional and regulatory structures established in the 20th century. What's most likely needed is a concerted effort to understand and a degree of institutional leniency, in order to be able to act in fields that haven't yet been solidified and where the influence of pressure groups is very strong and facilitated by a superficial knowledge of these new phenomena.

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