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Ana Isabel Reis, Fernando Zamith, Helder Bastos, Pedro Jerónimo, (org.)

Observatório do Ciberjornalismo (ObCiber)

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Journalism and Personalised Distribution

Tiago Gama Rocha
Faculty of Engineering, CoLab for Emergence Technologies, University of Porto, Portugal
tiago@openfield-creativelab.com

Paulo Frias
Faculty of Arts, Department of Journalism and Communication, University of Porto, Portugal
pfcosta@letras.up.pt

Pedro R. Almeida
Faculty of Law, School of Criminology, University of Porto, Portugal
palmeida@direito.up.pt

Abstract
With the active presence of algorithms as intermediaries between journalism and the public, the news industry is once again facing challenges that call for a new type of literacy. This article focuses on the concept of personalized distribution on the basis of mediation of information and provides a knowledge-base to identify and discuss key aspects of the inner working of algorithms. This analysis builds on the economical crisis of the news industry and remaps the revenue and value discussion for the news industry at the intersection of algorithmic intelligence and control. In order to capture capture the full range of challenges the news industry faces, the article combines the reflection of scholars (e.g. Nicholas Carr, Michael Latzer et al. and Michael A. DeVito) about the potential risks and biases that emerge from the increased use of algorithms with professional inputs (e.g. Jack Fuller, Mathew Ingram, Robert H. Giles and John Huey) about the recurrent slow reaction of the news industry to the emerging technological innovations. This reasoning is then complemented with a reflection that derives from the potential of algorithmic literacy. As a result, this papers uncovers new economical challenges and shifts of responsibility in the news industry at the levels of value, control and skills.
Keywords: Journalism; Sustainability; Data; Algorithms;

Introduction

The massive explosion of digital-journalism coincided with a shift in the traditional notion of computer-mediated communication (CMC) (Anderson *et al.*, 2014). Society has since become accustomed to having a mass medium which is

free for all (King, 2010) whereupon any user with internet access is able to consume, create and distribute content via the same hardware. During these last 25 years, the web has been conceptually associated with a tool for collaboration (Berners-Lee, 1989), an "always-open market" (Gore, 1994: 2), a collective intelligence enabler (Jenkins, 2006; Surowiecki, 2005; Levy, 1998), and a tool for sociality (Shirky, 2008). These conceptual metaphors interfere with the concepts of information and communication and have had a profound impact in every aspect of news culture (Stewart & Pileggi *in* Fuller, 2007: 242). Among all stakeholders of the journalism field there seems to be a consensus that:

a) this is a new era that endangers "the concept of one-way news, be it printed or broadcast" that had worked so well in the 20th century (Sagan and Leighton 2010: 119);

b) content, organizations, and business models should not be repurposed from print to new media (Jarvis *in* King, 2010: ix);

c) journalism is now less of a product and more of a process and has to learn to be less declarative and more discursive (Jarvis, 2011a);

d) in this medium the commodity is attention (Fuller, 2010a; 2010b; 2010c);

e) attention is fostered by building a meaningful relationship with the users (Jarvis, 2011b; 2011c; 2011d; 2011e; 2011f; 2011g);

f) news "reading" has become a much richer experience (Varian, 2013), and;

g) in order to build new hypotheses about the present and the future of journalism, time and leeway is needed (Sambrook, 2005; Pisani, 2006; Rosen, 2006; Gillmor, 2004; Potts, 2007).

This paper builds on these ideas of an evermore complex news ecosystem, constantly imposing new challenges for the field of journalism. We start by pointing out that, in trying to figure out how to succeed in this new, untameable medium, the news industry presents itself as poorly organized and unable to agree upon and institute fundamental change (Giles, 2010: 32). Accelerated by social, mobile and real-time technologies, the story of the relationship of digital technologies and journalism has since been described as either a tale of disruption (Huey *et al.*, 2013) or as a collision that has cast a shadow of uncertainty as to what future journalistic practices will be like (Shirky, 2009). Consequently, we also witness how the collapse of the certainty of sustainability has "scourged journalism with a poisonous blend of doubt and defiance" (Fuller, 2010c: 3). We then address how the slow reaction of the news industry to the advances in the characteristics of the medium has limited the ability of the industry to maximize value and increase

revenue. While the industry was still trying to adapt to being an always-on process, having to learn new skills and competencies to produce content by means of a new language, as well as learning how to interact with a new breed of users, technology was entering the "age of data ubiquity" (Pitt, 2013). In this age, new players have emerged that have since carved a leading position in the quest of competing for attention of users.

These players have introduced the use of algorithms, "a series of steps undertaken in order to solve a particular problem or accomplish a defined outcome" (Diakopoulos, 2014: 400). These algorithms "are characterized by a common basic functionality: they automatically select information elements and assign relevance to them" (Latzer 2014 *et al.*, 2014: 3). Consequently, algorithms now drive innovation in the most powerful medium of distribution in human history. *In Understanding Media,* McLuhan (1964) foresaw the constraints which a change to a more effective medium would bring: "Should an alternative source of easy access to such diverse daily information be found, the press will fold." (McLuhan, 1964: 207). Jack Fuller (2010a) illicites that McLuhan's oracular apocalyptic scenario did not happen, but stresses what many have said before: building a future based upon the same ideals that have supported newspapers for more than 100 years has proven and will continue to be a bittersweet venture (Fuller, 2010a). Hence, for the journalism field to outline a sustainable path of evolution, it is imperative to first develop a clear understanding of how algorithms interfere with the flow of information. In other words, the first step is to develop some reasoning that leads to the field of journalism becoming truly literate in today's world (Macbride, 2014).

Sustainability

Whenever an industry suffers a disastrous decline in revenue, the financial pressure ratchets up. When economic constraints put into question the very existence of an industry, it is difficult to have the time and clear vision to imagine a future. This is where journalism finds itself: with journalists from old and new media rightfully worried about the decline of paying news audiences, downsize of news staffs and advertising revenue (Mele and Wihbey, 2013). This sense of urgency has driven the industry to implement more than one economic model in the pursuit of new strategies: paywall, freemium content, subscription, funding from foundations, and donations from the audience, to name a few. Some of these new business model ventures are promising, but the consensus within the industry is that the majority do not have a track record to demonstrate their ability to sustain the industry (Giles, 2010). Some models might be working in specific

scenarios but "the quest for an economic model for journalism, whether commercial or nonprofit, remains elusive" (*ibid.*: 37). Hence, although we can say with certainty that the amount of news has risen exponentially and traditional news media still supply most them (Jurkowitz, 2014), so far the internet's threatening uncertainty has prevented the establishment of a silver-bullet sustainable scenario for publishers and journalists (Giles, 2010). The paywall - building virtual walls around access in an effort to try and generate revenue through content - serves as a good example to highlight the absence of a winning formula.

Content different from revenue

The raising of walls reasoning can be traced back to the past century, as seen in Iver Petersons' (1996) article "Commitments, and questions, on electronic papers" written for The New York Times. According to the author, the internet ethos of free goods is one of the main barriers for generating revenue (Peterson, 1996). To this day, within the news industry, it is still common to find professionals who argue that giving away content for free is not a synonymous of a viable economic model. Nice try but no: giving away content for free is not a viable economic model. The brands leaping into the paywall business-model, ground their arguments in the overwhelming success of the New York Times (NYT) and the Wall Street Journal (WSJ). When it come to charging for access to content, both brands are a beacon of success. We argue that this success has less to due do with the paywall itself and, more to due with the specific characteristics of the brand, the content and the audience they reach. The NYT and the WSJ are brands that already attract millions of visits per-day, proving that they are already established brands on the market. The content of these publications is taylor-made into making them what they've always been, a beacon of good content. They reach a global audience of mostly business people, government officials, and academics. This audience is very specific for two reasons: 1) they need to be up to date and, 2) they can afford to subscribe to more than one source of information (Mutter, 2013).

Unlike the success of newspapers like the NYT, we can now argue that, for some smaller newspapers bridging revenue ambition with access to content did not create the intended feedback (Ingram, 2013a; Dyer *in* Ingram, 2013b). On the contrary, some brands have since concluded that the paywall is a bad strategy altogether (Ingram, 2013c), and we are now witnessing a "paywall rollback trend" (Ingram, 2013a). Hence, the web brought economical constrains the the newspaper industry but those constraints are not caused by publishers migrating to an universally open-medium. As Jack Fuller (2010) argues, the struggle to find a

sustainable model came because the Internet "took away advertising" (Fuller, 2010a: 3).

Revenue different from Value

Selling the access to content has never been newspaper's main source of revenue. Even when news were only reachable in a printed medium, selling newspapers was never the biggest slice of the industry's income. The biggest slice of profit always came from selling advertising spots in the printed pages of a newspaper. More precisely, from selling space for targeted advertising. The interests of readers in subject matters that relate with their products and services (e.g. adds in the financial section were different than in the sports section) was always what compelled advertisers to use newspapers as a means of reaching potential customers. An argument supporting the influence of targeted advertising on news industry's revenue is the fact that news that have very high social value and tend to attract big audiences (e.g. a bombing here or an earthquake there) have always had very low commercial value due to the "difficulty of showing contextually relevant" advertisements (Varian, 2013). The above mentioned arguments lead us to conclude that the phenomenon of century old institutions failing to make it into the second decade of the 21st century did not come from the new medium's *ethos* of free access. This misconception of the origin of revenue allow us to address, during the course of this chapter, what we consider to be a fundamental discussion concerning the true value of journalism. In the words of Ingram, "too many newspapers seem to be ignoring the velvet-rope option [value = reader] and simply throwing up paywalls [content = value] out of desperation" (Ingram, 2013c).

Value = Attention

In the paywall business model, revenue is linked with access, meaning, brands content (news) is seen as the source of value. When arguing that revenue is linked with advertising, value emerges from a different object - the user (*ibid.*). Building walls around access to content might not increase the time which paying users spend on the digital newspaper but it will, for sure, limit the traffic. Limiting access is the same as decreasing value. This action creates even more constraints towards increasing revenue. Hence if a publisher wants to increase revenue, he needs to increase the time a user spends on his platform (Varian, 2013).

Increasing the time a user spends on any given platform has become a difficult task due to the overload of information available on the web. In the highly competitive environment of this ecosystem users are constantly being bombarded with information coming from multiple sources (*ibid.*). The glut of information adds to the sustainability equation precisely because our capacity to storage and integrate content at any given time is limited (Berka et al., 2007): "the greater the bombardment, the more that attention comes to play" (Fuller, 2010c: 60). This is where the basic economic problem news industry is facing lies - an increased competition for the attention of users (Fuller, 2010c; Carr, 2010).

Attention = Challenge

What we pay attention to results from a combination of top-down and bottom-up mechanisms that ends up in filtering the relevant and ignoring the irrelevant information from the environment (Boksem *et al.*, 2005; Posner and Petersen, 1989). Bottom-up mechanisms concern sensory factors such as the relevance and salience of the stimulus while top-down mechanisms correspond to cognitive factors, such as expectations, desires, interests and motivations (Corbetta and Shulman, 2002). Moreover, according to Mor and Winquist (2002), we can expect self-focus to vary significantly across situations and contexts, once that the situations and contexts frame our thoughts, either maximizing or decreasing our ability to focus (Mor and Winquist, 2002). It has been proven that, while using the web, alterations occur in our brains. The most prominent type of alterations relate to attention (Carr, 2010).

The Web environment is changing our brains in a way that such that external stimuli overcome internal stimuli for controlling attention (Carr, 2010). Due to the capacity of our brain to functionally and anatomically adapt to different environmental demands – called neuroplasticity – some studies have consistently showed that sustained attention, the capacity to maintain a certain level of attentional arousal, and top-down control of attention (Kirmizi-Alsan *et al.*, 2006; Sturm and Willmess, 2000; Posner and Petersen, 1989) tend to be suppressed at the expense of other cognitive skills. Selective attention, the capacity to respond to external stimuli, and divided attention, the capacity to attend to more than one stimulus at a time (Shinn-Cunningham and Ihlefeld, 2004; Posner and Petersen, 1989) are being enhanced. The above mentioned arguments lead us to conclude that, the information-overload web places a high challenge for users to be driven by top-down mechanisms. The web "promotes cursory reading, hurried and distracted thinking, and superficial learning" thus pushing the users to their "native state of

bottom-up distractedness" (Carr, 2010: 116-18). In sum, the medium changes users at the same time that it is changing journalistic processes.

Challenge = Change

Journalism and its production routines and conditions have always been shaped and influenced by technology (Dorr, 2016). If for decades the journalistic industry made huge profits from selling advertising and was the dominating factor for constructing a public-sphere, now both activities are under pressure from either IT (e.g. Microsoft), dot-coms companies (e.g Google) or social media platforms (e.g. Facebook). All of these have since become intermediaries for both delivering news and advertisement and have established themselves as market-makers with huge competitive advantages over the news industry (Latzer *et al.,* 2014: 17). In competing for user's attention, new cultural gatekeepers, such as Facebook and Google (O'Donovan, 2014) and other news aggregators (e.g. Flipboard) have positioned themselves at the forefront. These platforms introduced new tools and methods that allow for a deeper understanding of user's behaviors. This understanding is then used to optimize the process of driving user's attention towards specific content. This optimization is achieved by using algorithms designed to predict user's needs and desires. This knowledge about the users is then used to optimize the process of targeting advertisements. Hence, by valuing users' behavior and optimizing attentional driven processes, these platforms are positioning themselves to increase their revenues. Moreover, none of the above mentioned platforms develops their own content, a clear sign that in the age of web services, value truly lies in users, not in content.

With algorithms entering the stage of professional news distribution (Dorr, 2016), it is our reasoning that both editorial structures and journalistic routines are being forced to change significantly. The next chapter explores how news distribution and, consequently, consumption is being overrun by this new trend of algorithms that assign relevance to pieces of information and distribute content in a personalized manner. In a short span of time personalization is already being used in a wide range of our daily online activities, influencing "almost all the information you consume, from news stories, to social media updates, to movies, books, and television programs" (Macbride, 2014). While this concept might once have had relevance to only a few data geeks, automated-algorithm distribution now concerns leaders and services across every sector, and consumers who stand to benefit from its application (Manlika *et al.*, 2011).

The imperative of algorithmic literacy for contemporary journalists

During the course of the first chapter we have argued that the field of journalism has always been challenged due to technological developments. These technological developments are part of a continuum of eras of so-called digitalisation which will continue to unfold in the future. We called attention to the fact that there have been technological developments and human uses of said developments in the past and that responses by the field of journalism have been neither well-informed nor well-timed. As a consequence, most of the responses to these challenges have not been successful. We explained what went wrong in the reasoning of how the industry chose to respond. We concluded by pointing out we are on the cusp of riding the wave of a new tech trend. This new trend of distribution empowers algorithms with the responsibility of selecting how information flows. Our reasoning is that the industry has still not understood how algorithms work. The second chapter will be devoted to addressing various aspects of algorithmic-literacy.

Terminology

One of the core objectives in media industry scholarship is "to develop deeper understandings of the processes via which media content is produced, consumed, and interpreted by media audiences" (Blass and Gurevich, 2013: 33). The recent study of the impact algorithms have on the flow of information, like other new-born technological innovations, still lacks a coherent and consistent terminology (Garcia and Calantone, 2002). For this reason it is important to clarify the terminology we adopt during the course of this chapter. Whenever we address the grand scale effects of algorithms, we will make use of Latzer *et al.* (2014) coined concept of algorithmic-selection. All the algorithmic selection applications identified by the authors differ in scope and applicability. The concept can relate to either search, aggregation, observation/surveillance, prognostic/forecast, filtering, recommendation, scoring, content and, allocation. All of these applications are based on filtering through data and applying rules about what the world is like (Latzer *et al.*, 2014: 6). This common link leads us to argue that personalization is a functionality that any of the above mentioned applications might have. Whenever discussion the grand scale effects of the increased use of algorithmic selection, we are also discussing the possible effects of personalization. When addressing the use of personalization in the context of the journalistic process of distributing news and shaping public opinion, we will adopt the concept of algorithm-editors. This helps us

to detach personalization from human-editors (DeVito, 2016). An algorithm is here seen as an object that is used in both algorithmic-selection applications and algorithm-editors (C.W. Anderson, 2011). This mean that personalization does not exist without algorithms. Data is the fuel that runs the engine of algorithms.

Algorithms

We are living in at least three periods that build upon digital data: the information era, the social era, and the big data era (Bloem *et al.*, 2012: 5). Although the advent of the three periods was sequential, all are equally important in terms of their effects on the flow of information. Information, sociality and big data operate as cogs of the same machine. Our initial efforts are focused on clarifying how data connects with the problematic of competing for the attention of users in the age of algorithms.

Tracking Data

As we have come to realize, in the digitally-connected world, what Google does, the rest of the world mimics. A long time ago, in their search engine Google started tracking the individual digital footprint of users. This individual footprint is generated in the interaction between people, machines, applications and combinations of these (*ibid.*). Google soon realized that in order to drive the attention of users on the web it was not sufficient to simply track user's interaction within their own platform. Google needed as many data sources as possible. Soon, for every platform involved in this process of tracking digital footprints, it became critical to have access to other data sources as well: personal data (current location, home location, age, gender, initial contact date, etc.), as well as the activity of users in third-party platforms (social media, public information, activity on other web sites and web pages, etc) (Latzer et.al, 2014; World Economic Forum, 2011; World Economic Forum, 2015). Because a platform has access to all of these data-sources, suddenly, there is an abundance of individual digital-footprints. We have become largely accustomed to our era being coined as the "Age of Big Data" (Lohr, 2012). Notwithstanding, the term "Big Data" is for the most part ambiguous or ill-defined (Boyd and Crawford, 2012). Just because large pools of data can be captured, communicated, aggregated, and stored, does not imply we are dealing with big data. Big data is not related to the abundance of data flows and data sources but rather to the process of analyzing said data (The Boston Consulting Group, 2016). the opportunities for optimizing the process of competing for the

attention of users emerges from this data analysis. This is a process too vast, too complex and too abstract for humans to understand. Only a machine can do it, and they do it by means of algorithms.

Feedback-loop

After gathering historical data from all the users, a statistical model is then used to analyze the aggregated data. The statistical model will make predictions based on this data and suggest an output that will most likely be useful for the user. Gathering, analysing and predicting is a cyclical process, meaning that the user's behavior towards the prediction feeds the initial data sources (the user's interaction with the *output n* serves as the *input n+1*). This is an ongoing, never-ending process of the refinement of the relevance of the output. Refinement implies that the "quality of selections feed back into future selection processes and thus their increase quality" (Latzer *et al.*, 2014: 13). In other words, the feedback-loop tends to become more efficient and provide better quality of service with the growing use of a service.

When not in the presence of a feedback-loop, a platform depends on the user deciding what to search for. In a platform offering feedback, the system automatically selects relevant information tailored to each specific user. This implies that personalization is not a passive service, waiting for the users to pull information, in fact, it is quite the opposite. Personalization engages in pushing information towards the users. This active characteristic of personalization is the focus of the following argumentation.

Pushing information

The point of this discussion is not to argue for whether or not the use of algorithms result in valuable insights for optimization in a broad range of areas. We assent with the notion that manipulating large and complex datasets offers the possibilities of identifying previously impossible levels of insights, granularity of analysis, and relationships between elements in the dataset (Bertot *et al.*, 2012). When it comes to the specific case of personalization, we agree that it *helps* users smoothly navigate the web, while at same time keeping them from drowning in the information glut. The issue we discuss concerns who is providing this *help*, how the users are perceived by this *help*, who designs this *help*, how much the users know about the internal processes that make the *help* work. This is a line of inquiry that not only helps the industry to "respond effectively and adapt to the rapidly

changing technological conditions under which contemporary media industries operate" (Blass and Gurevich, 2013: 33), but more importantly, helps scholars grasp how algorithms "are being constructed, and the assumptions, priorities, and inputs that underlie their construction" (*ibid.*: 35).

Control

This active process of helping (predicting and pushing relevant information) can be described as algorithmic intelligence (Anderson, 2011: 536). In the specific case of algorithm-editors, algorithmic intelligence is important because it changes the way that journalism and audiences relate. If we take the example of Google's or Facebook's news feed, it is clear that their algorithmic intelligence does not "operate directly in parallel with the story selection process at a traditional news organization" (DeVito, 2016: 2). And still, these feeds play an important role in "mediating journalists, audiences, newsrooms, and media products" (Anderson, 2011: 530). Mediating a relationship between the public and power structures is in itself an expression of power. Hence, algorithm-editors can be seen as a new form of power (*ibid.*; Diakopoulos, 2014; Latzer *et al*., 2014; Dorr, 2015). More precisely, this control over the flow of information can be addressed as a process of *automated gatefication*.

Automated gatefication is based on computer-generated metrics. This datafication of the world relies primarily on correlation, meaning the feedback-loop is not based on "deep comprehension of information" (DeVito, 2016: 4). This is an important aspect because it establishes that the ability to predict what users consider to be relevant information is a limited process. Also, this process of datafication points out the risks of algorithms relating to users in an "aggregated, big-data kind of way" (Schudson and Katherine Fink, 2012), where users are considered quantifiable and predictable objects (Anderson, 2011). Thus, *automated gatefication* is encouraging the establishment of a non-participatory audience that feeds on the agenda imposed by the algorithms (Anderson, 2011) and creates calculated publics (Diakopoulos, 2014).

Biases

If users understood "human-editors' values, and their flaws" (DeVito, 2016: 3), when it comes to algorithmic-editors, there is a "technologically-inflected promise of mechanical neutrality" (*ibid.*: 4). This popular understanding of an unbiased push of information could not be furthest from the truth. Algorithm-

editors have biases just as surely as do human-editors. These biases are endemic to all algorithmic systems, meaning, they have a direct impact on each of the major functions of these algorithms (*ibid.*). The first bias that should be addressed concerns the limitations of technology itself. This limitation is related to the computing and processing power of the technology structure that supports the algorithms. But the most relevant bias has nothing to due with technology, but rather, it is linked to those who create the technology.

An algorithm is a man-made object. The definitions and criteria of the creator are the backbone that teaches the algorithm how to learn (Diakopoulos, 2014). We are not just addressing the engineers who build the value-based decisions of the machine. The deep impact biases have on the algorithm's output is also related to a *pre-existing* bias (DeVito, 2016). This pre-existing bias is associated with an individual or societal input that inevitably finds its way into all stages of all algorithmic-selection designs. Hence, this bias is endemic to all algorithm systems (*ibid.*), meaning that algorithm-editors have to be considered a process / creation / object that derives from the individual perspectives and experiences of their makers. The fact that the biases of the algorithm are not generally recognized is just the tip of the iceberg. These algorithms operate behind the scenes without the user being aware of how they influence the selection of the content accessed (Latzer *et al.*, 2014). The complexity of the value-based decision-making of the algorithm is covered by an opaque cloth, obfuscating the inner workings and thus making it difficult to assess the intent of the maker. This inability to grasp the contours of their power is what drove many scholars to start addressing algorithms as black boxes (e.g. Anderson, 2011; Diakopoulos 2014).

Risks

As we argued above, algorithms do far more "than simply aggregate preferences" (Anderson, 2011: 540). They are active players that powerfully shape users perceptions of the real (Latzer et. al, 2014: 6). Furthermore, algorithms are man-made and therefore we have to take into account the intent behind them (Diakopoulos, 2014: 10). Intent is hard to determine because the inner workings of an algorithm are usually locked in a black box. As a result of this it can be difficult to understand how *automated gatefication* works. All these facts support our initial reasoning of the urgency for the field of journalism to develop a better understanding of algorithms. It is not just about understanding how, through the use of algorithms, the flow of information is happening in a non-neutral, flawed, biased and, to some extent, gatekeeping manner. It is also about understanding

what the risks that emerge from the large scale use of opaque, *automated gatefication* are interfering with the formation of public opinion.

The power which this *automated gatefication* holds over the flow of information might not always be intentionally exerted. In some cases this power might be incidental. Notwithstanding, whether incidental or intentional, filtering decisions always exert their power by over-emphasizing or censoring certain information (Diakopoulos, 2014). Diminishing the variety of information available implies that the user is labored towards a distortion of the real (Latzer *et al.*, 2014). This distortion can come in the form of manipulating reality, instigating social discrimination or silencing those who do not fit the filter. *Automated gatefication* is then blatantly liable to create constraints on the freedom of communication and expression. Going back to the issues discussed in beginning of this chapter, by having the flow of information evermore controlled by *automated gatefication* based on users' individual footprint, we are also witnessing an increased risk of serious threats to data protection and privacy. Moreover, by delegating power to algorithms, as was discussed in the the first chapter, we are creating uncertain altercation in how our brain functions. For example, it is unclear what transformations and adaptations are occurring in the human brain in this era of "growing independence of human control" and, consequently, of "growing human dependence on algorithms" (ibid.).

Final Remarks

This paper identified that the news ecosystem is growing more complex than ever before. It is our reasoning that a lack of algorithmic literacy not only increases the economical constrains which the news industry faces. As discussed in the first chapter, the lack of awareness concerning targeted advertising led to catastrophic economical constrains for the news industry. Personalization, a process that was inherited from the target advertisement. Content is being distributed evermore by technology companies instead of journalists. Furthermore, these tech companies increasingly delegate important authority to sophisticated algorithms. The purpose of these algorithm-editors is to assign relevance to specific content in an effort of steering the attention of users towards their platforms and services. With signs of another slow reaction towards understanding the new technological trends, the news industry is allowing concentration of users on non-journalistic platforms. This exodus of value is crippling revenue opportunities. Moreover, by giving up control over this process of distribution, the field of journalism is giving up control of their most important role in society, namely mediating the relationship between power

structures and citizens. These companies act as intermediaries between citizens and news but do not incorporate journalistic-values in their processes. While users are getting accustomed to using these platforms, power and authority on public opinion formation is now at the hands of companies who do not necessary feel the need to do anything else but satisfy their shareholders needs and make money. Their processes of filtering information are opaque and solely based on datafication of human behavior. Also, the increasing role of algorithms is taking on influential gatekeeping and agenda-setting functions. This *automated gatefication* presents us with several risks, the most relevant being the the possibility of distortions and manipulations of the real.

If in the past decade, the journalism industry saw the need to add experts to design content for the web and to perform social media strategies, now the newsroom is forced to consider adding experts that understand how to perform data research, mining and experimentation. These experts cannot be asked to develop a one-size fits-all solution because the web and the user are constantly changing. To add value, to grasp the attention of users, a great effort is needed in order to acquire core resources: tech expertise, hardware infrastructure and quality of data. Only if such steps towards change are taken, will the news industry tap the full potential that comes with the use of algorithms. It is important to finalize with a clarification. With the newsroom being, once again, forced to adapt to this mechanical change, misconceptions might arise. We can see evidence of this in the discussion of whether or not algorithm-editors will take over the editor's job. It is not about replacing, but rather, about how machines can free editors to do what only human editors can do. A human-editor will still decides the standards of one's editorial guideline. Also, a human still decides to what type of audience they are creating the content. This is why it is important to remember that machines were created to free humans from performing complex mathematical tasks, in order that they might use their time doing other important things. For example, learning how to limit their dependence on companies who do not stand for journalistic values. Without a learning curve, there is no knowledge base to guide journalism in this era. It is crucial to create this knowledge base within the field of journalism and to take initial steps towards outlining future research to be conducted.

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