Working Paper to be presented at the IPP Conference 2018, Oxford Internet Institute.

The Daily Us: Legitimizing Public Service Media in the Age of Personalized and Commercialized Social Media

Urbano Reviglio, Ph.D. Candidate in Law, Science and Technology (LAST-JD)
Email: urbanoreviglio@hotmail.com

Abstract. The paper questions the role of public service media (PSM) in the digital era. The Internet has indeed disrupted previous patterns of production and consumption of information. In particular, due to media content personalization filter bubbles and echo chambers are concurring in the fragmentation of audience and political polarization, threatening the diversity of information and a common base of facts, what might be referred as 'Daily Us'. The paper is a theoretical and interdisciplinary contribution structured as follows. Firstly, it analyzes the contradictions lying in the filter bubble research to advocate a precautionary approach. Then, it questions the role that Public Service Media has in counteracting the risks of personalization and sustain a 'Daily Us'. Consequently, it analyzes the principles that should guide it in the emerging media landscape, more specifically in social media. Finally, the paper advocates a new emerging role of Public Service Media, which is that of "Public Service Algorithm and Navigator". Based on an open-source 'counter-architecture' for serendipity, it has proposed a preliminary framework for empowering users providing control over certain design choices as well as discovery and visualization tools, to eventually offer them in a public plug-in for social media. Limitations and unintended consequences have also briefly discussed.

Introduction

Media pluralism is under attack, showing a systemic malfunction in the protection of freedom and pluralism at the European level. Mediated communication is at a critical juncture that entails global phenomena such as polarized news coverage, hate speech, market concentration, viral misinformation and, more generally, the crisis of journalism. The paper focuses in particular on how personalization of media content online may increasingly limit the diversity of information by creating filter bubbles (Pariser 2011) and echo chambers (Sunstein 2009). As a reaction to the new media environment, media ethicists and policy-makers began to discuss how to maintain a 'sufficient' exposure to diverse information. Given that the risks of filter bubbles are very hard to prove and, eventually, to counteract (Borgesius et al. 2016), it is discussed how to re-conceptualize from a normative perspective the experience of diversity to identify what kind of intervention pursue.

'Media reform' as a concept has generally been linked to these kinds of critical junctures and attempts to address them (Horowitz and Nieminen, 2017). Apart from relatively few examples, Public Service Broadcasting (PSB) and its digital, multi-platform version Public Service Media (PSM) have never been at the center of media reform activities, even if they are cornerstones of democracy. Despite the urgency to find new strategies, PSM still need to take shape in a concrete manner. It is indeed regulation that is going to decide in which way online communication, PSM and internet

platforms will develop. Several key issues, then, need to be further addressed; what is the role of PSM in such emerging media landscape? Can it represent an institutional mediator able to help to solve the crisis of media, sustain the diversity of information and, more generally, reinforce democracy and human rights versus the risks of filter bubbles and echo chambers? How can PSM concretely be legitimized to counteract the principles that shape (social) media today, such as high speed, superficiality, tabloidization, short-term pleasure, hedonism and homophily?

The paper is a theoretical and interdisciplinary contribution structured as follows. Firstly, the paper shows the contradictions lying in the filter bubble research. Contrary to recent research showing the limited extent of such phenomenon, arguments in favor of a precautionary approach are provided. Eventually, the paper also questions the role that PSM in the social media landscape. Following Karpinnen (2008), it is applied the idea of 'agonistic pluralism' (Mouffe, 2000) to the context of media politics in order to argue for concrete institutional arrangements in media policy. Secondly, the paper analyzes the values that could guide a renovated role of PSM in facing the challenges outlined above. These are analyzed in relation to the current debate and already-proposed solutions. Finally, based on the previous analysis, a preliminary ideal framework for empowering users providing a counter-architecture with discovery and visualization tools is proposed. Limitations and unintended consequences are also discussed.

1. Filter Bubble Research and its Limits

Internet constituted a significant challenge to established media policies and the role of public service broadcasting. With large media providers no longer serving a gatekeeping function, the diversity of individual exposure turned on the choices of individual users and algorithms. This has substantially changed the existing models of information and news production, distribution and consumption. The epochal change from information scarcity to information abundance brought the need for a balance between a pull and a push approach (Pentina and Tarafdar, 2014), between explicit and implicit personalization (Thurman, 2011). In other words, between autonomy of choice and algorithmic and platform delegation. Of course, personalization performs a fundamental role of knowledge management in order to restrain information overload, reduce complexity and satisfy Internet users and preserve our scarcest resources: time and attention. It is, however, an imperfect tool without sufficient legal supervision.

In 1996 Internet scholar Nicholas Negroponte imagining our hyper-connected future coined two novel often-cited concepts: "daily me" and "daily us". The first generally refers to personalized online news summaries, while the latter to non-personalized online news summaries. Then he suggested that

these were not two distinct states of being - black and white - but that we would have tended 'to move between them'. This is not the case in today's personalized social media in which special-interest intermediation is privileged to a more general one. So far, explicit access to a 'daily us' in Social Networking Sites is quite rare. In other words, a user cannot easily and effectively be exposed at will to – or filter – challenging viewpoints, public issues and minoritarian media and opinions. Of course, any user can access a vast choice of online newspapers. Yet, news consumption is still changing. Firstly, despite contrasting analysis, less and less young people use to consume traditional media and newspapers. More generally, then, the actual change concerns an irregular, rapid, personalized and serendipitous consumption of 'social news' through the smartphone. Thus, users cannot easily fully benefit from the potential richness of the online social networks they built and live everyday. A small group of platforms – in particular Facebook – act as the ultimate gatekeepers for increasingly more users. They provide a personalized experience (mostly and increasingly implicit, thus unknown - see Thurman, 2012) but very little control over the information filtering processes. As such, short-term pleasure, soft news, homophily, entertainment and advertisement occupy a privileged place. This is worrisome for those who argue the existence of the filter bubble effect, its role in reinforcing echo chambers and, in turn, in spreading misinformation. Media pluralism and autonomy of choice may be indeed threatened, so does democracy.

Academic literature show that online content personalization can indeed create filter bubbles, intended as a cultural and ideological bubble in which a user continues to consume content that mostly reinforces its own worldview, beliefs and interests (Pariser, 2011), and *echo chambers,* which are generally intended as group situations where information, ideas, and beliefs are spread and amplified, while dissenting views are ignored (Sunstein, 2017). The major risk is that users end up in a self-reinforcing cycle of opinions, hardly pushed to discover alternative and challenging standpoints in the so-called 'marketplace of ideas'. As a result, individuals may reduce opportunities to self-determine, thus limiting personal creativity and, also, the ability to build productive social capital (in particular weak ties) (Pariser 2011). At the collective level, media pluralism would be weakened. Thus, the audience would fragment and people would be more politically polarized and vulnerable to censorship and propaganda (Sunstein, 2017). This, in turn, would help to spread misinformation (Vicario et al. 2016). Another prominent risk, then, is growing 'epistemic inequality' (Lynch, 2015). The potentially detrimental effects of these phenomena are indeed unequally distributed.

Currently, research is contradicting, ambiguous and, ultimately, unreliable. The risks of filter bubbles, in fact, are very hard to prove and, eventually, to counteract (Borgesius et al. 2016). Most research is inconsistent and inconclusive because they are generally survey-based or based on a small or unsatisfactory sample. In the light of the rapidly changing media landscape many studies become

rapidly out-dated. Also, platforms are constantly changing their algorithms and business models. There is indeed a crisis on the study of algorithms (Bodo et al. 2017). Important gaps in research remain as well as a consensus on a common set of definitions (Tucker et al., 2018). While insights on the main causes, risks and unintended consequences are currently known, little is known on the extent of these consequences and on the potential legal and socio-technical solutions.

Moreover, there are several social and technological trends that might exacerbate these unintended consequences. Foremost, its invisibility. Not only implicit personalization occurs invisibly and only a minority of users acknowledges the phenomenon[1] (Pariser, 2011), but another risk lies in the fallacious perception to consume a diverse and balanced media diet even though this often depends on the illusion that our own worldview and interests are more widespread that they actually are (so-called *majority illusion effect* - Lerman et al., 2016). In addition, the effects of personalization on users are rather heterogeneous as algorithms adapt to individuals' personalities (Lanier, 2018). Also, the type of social ties dominant in one's social network may provide different experiences and indeed moderate the role of social curation in civic knowledge formation (Pentina and Tarafdar, 2014). This means that certain individuals and social groups may be much more threatened and, eventually, manipulated than others. In this sense, personalization is a rather heterogeneous and invisible phenomenon.

Furthermore, there is the prospect of a future "hyper-personalization" (or 'perfect world filtering', see Sunstein, 2017) in a world of Ambient Intelligence[2], whereas there is a rather steady increase of social media's use as a source of news.[3] This becomes even more concerning considering the increasing reliance in mediated interpersonal communication and the blind trust to algorithmic authority (Sherky, 2009). At the same time, algorithms and design choices tend to nudge users' comfort zones, especially through homophily (DeVito 2017) which is the primary driver of content diffusion, especially misinformation and conspiracy theories (Del Vicario et al., 2016). Information intermediaries may also increase engagement by developing unconscious addictive rituals based gamification and dark patterns or by exploiting 'affective computing' and 'captology', a study at the intersection of computer science and psychology (Fogg et al. 2009). Such subtle persuasive power challenges the autonomy of users and threatens to impoverish them (Gal, 2017).

---

[1] - Only 24% are aware that Facebook prioritizes certain posts and hides others from users' feeds, while 37% believe every post is included in the newsfeed (Powers, 2017).

[2] - There is a fair amount of unpredictability in communication technology development, preventing precise predictions regarding what future implementations of personalization will look like. Yet, it is prospected the idea of Ambient Intelligence related to the Internet of Things. It is a vision in which automatic smart online and offline environments interact with each other and take an unprecedented number of decisions for us and about us in order to cater to our inferred preferences. This may represent a new paradigm in the construction of knowledge (Hildebrandt and Koops, 2010).

[3] - In U.S., two-thirds (67%) report that they get at least some of their news on social media (Shearer and Gottfried 2017). Yet, just 14% of Facebook users believe ordinary users have a lot of control over the newsfeed and only about 36% intentionally tried to influence that (Smith 2018).

Finally, the externalities of engagement-driven personalization may be rather slow to manifest. Yet some commentators argued its role of social media in Brexit, Trump election and the rising of "populism". The presumed effects of personalization remain also deeply ambivalent, in the sense that they can both lead to collective political action and more fragmentation unequally among social groups. All of these phenomena concur to render the assessment of the risks of personalization deeply unclear and, far from mere moral panic or technological determinism, more concerning. Even if the filter bubble research does not provide sufficient evidences that it might be a social problem, it has the actual potential to be profoundly detrimental. Even if it does not affect all of us, it might already affect certain limited groups of people due to the heterogeneity of users, thus indirectly the society as a whole. For these reasons, in this paper is advocated a precautionary approach. Lack of full scientific certainty shall not be used as a reason for postponing measures that might prevent the risks of such phenomenon.[4] Yet, fundamental questions remain: is it possible to design a constructive and educative social media, where users have autonomously well-grounded opinions and beliefs in a sufficiently common base of facts? In this respect, what might be the role of Public Service Media in Europe and how it may actually intervene?

2. The Role of Public Service Media

The concepts of media pluralism and diversity are intertwined and well-established principles in Western Europe's media research and policy since the 1960s. The European Commission (2007) explicitly recognized diversity as a policy goal that "embraces a number of aspects, such as diversity of ownership, variety in the sources of information and in the range of contents available" (p. 5). Yet media policy has mainly aimed at organizing the supply-side of pluralism through various sources that focus on content diversity (Helberger et al., 2014). The practical implications of this policy have long been associated with public service broadcasting (PSB). Of course, Internet constituted a significant challenge to established media policies and triggered a debate on the role of public service media, its gatekeeping function, and how to guarantee the exposure to diverse information. It is in this respect that this paper questions the role of Public Service Media (PSM). By doing this, a brief analysis of its history to highlight the shift from PBS to PSM and the emerging of a new paradigm of media policy is necessary.

[4] - Similarly to Principle 15 of the UN Rio Declaration:
''In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.''

2.1 The Evolution of Media Policy in Europe

The notion of public service in relationship to media was developed in the early 20th century under a specific set of political, technological and social conditions. Perspectives on this relationship changed across time and space. Yet there remained 'an overlapping consensus on certain core normative criteria' that can be categorized into three main principles the latter two deriving from the first (Born and Prosser, 2001; see also Picard and Pickard, 2017): (1) Enhancing, developing and serving social, political and cultural citizenship; (2) Universality; and (3) Quality of services and output. Van Cuilenburg and McQuail (2003) identified three phases in western communication policy-making paradigms that help to shed light on the evolution of PSB: 1) emerging communications industry policy in the period before the Second World War (WWII), 2) public service media policy after the War until the 1980s, and 3) new communications policy since the end of PSB monopolies.

The first phase was characterized by public monopolies with the limited goals of protecting the interests of government and nation, promote innovation and provide an efficient public service, whereas the second phase was characterized more by normative and sociopolitical rather than technological and economic considerations. The lessons of WWII in the misuse of mass media for propaganda and the dangers of monopoly control were internalized. Encouraged by 'postwar reconstructionism' and a more collectivistic spirit, media policy started to promote diversity of ownership and content, limit monopoly and deal more effectively with the press. Such policies went much further in Europe rather than in the US, in particular regarding PSB, despite significant differences from one country to another.

In the last phase, the rise of commercial television, that from the 1980s led to a majority of private stations by the mid-1990s, gradually reversed the monopoly PBSs used to have. Even if it retains some legitimacy and popularity, the normative policy paradigm of the postwar era declined in authority and scope and changed in the means for achieving its goals. This was not much due to technological changes but mostly to economic and political forces legitimized by the ambitions of media companies and governments. As soon as PSB became the exception rather than the rule, its activities and funding, if not its very existence, began to be considered as a disturbance of market relations (Bardoel and d'Haenens, 2008). PBSs indeed changed their programs to better adapt to audiences and/or advertisers while taking over certain orientations of private competitors, such as competition and cost awareness. As a consequence, PSB core values began to be eroded.

Despite differences that relate to the national context of PSBs, it is still widely believed that basic functions, such as a low-cost and universally available reliable provision of information, education and culture, and the catering for minority tastes and interests, cannot or will not be sufficiently served

by the commercial market (Bardoel and d'Haenens, 2008). Yet, it is believed that PSB should not be restricted to remedying 'market failures' but to respond to the needs of citizens – which are different from those of consumers. Thus, not only it should provide a counterweight to the commercial media but it is expected to set quality standards for the whole media landscape. Anyhow, fierce competition and new consumption patterns in the television landscape made increasingly difficult for them to attract and sustain audiences. In fact, people choose between newspapers or TV programs according to their tastes or to their political orientation, and if they have more choice they seem to watch less programming of traditional public service genres (Tambini, 2004).

At the beginning of the digital revolution, the discussion about the future of PSB revolved around two competing visions: those who were critics of the further commercialization of PSB and those who simply wanted to save PSB by adapting it to the system (most of the PBSs themselves and policy-makers). In particular, the European Broadcasting Union (EBU)[5], an alliance of public service media, followed the second path. The EBU Digital Strategy Group (2002) considered PSB as an 'island of trust' amidst multimedia companies offering linear broadcasts and online programs. Public broadcasters, however, have learned to adapt to predominantly commercial media markets, by choosing a middle way between popularization and purification in their program strategy.

As a consequence of the new emerging landscape, it began the debate on the transition from PSB into "Public Service Media" (PSM) (Bardoel and Lowe, 2007).[6] This implies to extend public services beyond radio and television to encompass the full specter of the Internet. In addition, public service audiences began to be increasingly regarded as partners and participants. Public broadcasters had to redefine their relation to the public indeed. Even though the public is its main stakeholder, in fact, many PSBs have kept it at a distance, while politics and governments proved to be the preferred partners. This is also a result of a tradition of paternalism, and more or less inherent to the pedagogical imperative practiced by public broadcasters in the past. The main challenge essentially derived by the individualization of society, characterized by less collective participation, lower interest in politics, and a shift to a multicultural society. One of the main results was the gradually diminishing reach of PBS among minorities and 'problematic groups' such as younger generations, migrants and the less

[5] - EBU is an alliance of public service media (PSM) organisations, established on 12 February 1950, made up of 72 members in 56 countries, but unrelated to European Institutions. The main objective of EBU is to assist its Members in this period of unprecedented technological changes. European institutions that deals with similar issues are the *Council of Europe* and, particularly, the *Directorate‑General for Communications Networks, Content and Technology*, the Commission department responsible to develop a digital single market.

[6] - Splichal (2007) gives a concise definition of PSM: "In normative terms, public service media must be a service of the public, by the public, and for the public. It is a service of the public because it is financed by it and should be owned by it. It ought to be a service by the public – not only financed and controlled, but also produced by it. It must be a service for the public – but also for the government and other powers acting in the public sphere. In sum, public service media ought to become 'a cornerstone of democracy'" (Splichal 2007, 255).

educated. To overcome this, many PBSs have started experimenting with new ways of legitimization, accountability and transparency towards citizens and society.

PSBs initially started using social media to reach and engage new audiences. For instance, "social network guidelines" were implemented to help employees using social media properly (van Dijck anad Poell, 2015). Such turn to the digital environment also stimulated PSBs in Europe to experiment with a public version of "social TV". Online participation was considered a key-strategy to regain their position in national arenas. Such commitment, though, does not seem sufficient. One should not oversell the potential of sites like Facebook for PBSs because they actually reach only a tiny fraction of their audience (Moe, 2013). Such audience, however, is widening across the internet and is increasingly – and more often indirectly – affecting the traditional media landscape.

While some scholars argue that European governments should enable a European PSM to provide public service Internet platforms and/or services (Burri, 2015; Fuchs, 2017; Bennett, 2018), other have been skeptical of the possibility to reform the public service system as such (see van Dijck anad Poell, 2015). Yet, most scholars agree that PSB requires new forms of justification, not simply to save PSB as a public institution but to educate a generation grown up in a global multi-platform world. A new media policy paradigm, especially for PSM, is thus needed, and the three main paradigms discussed earlier actually highlight the deterministic influence not much technological but of social values and belief (Bardoel and Lowe, 2007).

2.2 Towards a New Role of PSM?

EBU is already seeking to support its members as they struggle with both the opportunities and challenges of Big Data through the *EBU Big Data initiative*, an interdisciplinary network launched in 2015 that aims to guide PSM in the implementation of data-driven strategies. The initiative comprises the following four workflows: data principles, personalized services, media content strategy and audience measurement. The latest, in particular, is addressed with the analysis of the key challenges (2017). The major goals are to find advanced indicators and to facilitate data democratization through self-service tools and data visualization and, eventually, to understand 'how to develop recommendation systems that translate the public service DNA' (EBU, 2017: 25). It is already stressed the encouragement of content discovery to disrupt filter bubbles (EBU, 2017: 26). Actual specifications for recommender systems are, however, still to be developed.

A majority of PSM in Europe are now moving in the direction of digital and algorithmic personalization. In particular, BBC has the most advanced policy and implementation of algorithmic personalized services across genres as BBC policymakers believe they help to realize its goals. In particular, the hope is that digital innovation will help attract younger audiences. Yet, many

institutions with similar histories and comparable media system frameworks are taking up different positions (Van den bulck and Moe, 2017). Some PSBs consider the possibility to reach universality through personalization, while other consider personalization to work against universality. Also, some privilege implicit personalization over an explicit one, with very different outcomes on PSM goals. Moreover, due to fears of filter bubbles and echo chambers, the attention of EBU is focused exclusively on exposure to diversity—at the cost of considering the need for common arenas of discourse, thus the values of universality and publicness, and how broadcasting and interactivity/choice can reinforce each other (van Es, 2017). As of now, the shift to big data appear as an adaptation to the neoliberal "surveillance capitalism" (Zuboff, 2015), while representing an impending 'crisis of imagination' (van Es, 2017). Most notably, these efforts are limited within PSBs platforms.

There are, nonetheless, radical proposals that advocate either 'Public Service Internet' (Fuchs, 2017), either 'Public Service Algorithms' (Burri, 2015; Bennett, 2018). Burri (2015) argues the idea of a "Public Service Navigator" (PSN) (Burri, 2015) as "a mechanism for influencing the conditions of access to content, particularly its visibility, discoverability, and usability [which] (...) reflects the reality of digital abundance and disorder and the fragmentation of audiences" (Burri, 2015, p. 1349). Burri envisions three scenarios; firstly, "PSN as an Add-on to PSB", a partnership with existing information intermediaries to provide users with more "information about information" (ibid. p. 1350). A second scenario called "PSN as a (Discrete) Service" that envisions a separate service to recommend quality content. As it operates on users' demand its contribution to diversity exposure may be less important but simultaneously, as an independent service among others, it will not be subject to accusations of paternalism. The third scenario, "PSN as a Broader Media Policy Initiative", does not foresee specific services or institutions but "a bundle of services, or an institution but as a broader, distributed media-policy initiative – as a new mission of public-service media" (Burri, 2015, p. 1352). These scenarios, however, are not mutually exclusive. It is indeed argued in the next sections a scenario that could realize the first two scenarios while preparing the ground for the third one.

Before to analyze potential scenarios for PSM, it is necessary to discuss and, eventually, reconcile the values involved in the design process. The calculation of large volumes of data, in fact, requires the use of simplified proxies for complex values. For PSM it is highly important that the output of these proxies credibly relates to their aims. The consequent analysis implies to re-discuss the values on which PSM was historically legitimized to adapt them to the digital media landscape.

Conflicting and Novel Values of PSM

The six core values of PSM, as defined by the EBU (2012), are: universality, independence, excellence, diversity, accountability, and innovation. "Universality" refers to the need to address issues that are both locally and globally relevant. "Independence" means impartiality from commerce, government, and specific audience demands. "Excellence" stands for standards in quality content and expertise. "Diversity" anchors the principles of democratic representation and equal opportunities for all civic groups to express themselves. "Accountability" obviously denotes a high level of trust in the accuracy and relevance of information. "Innovation" entails a pledge to the exploration of new technological, aesthetic, and cultural forms. To this set of values, there are important nuances that can be highlighted, especially in relation to the digital environment.

First of all, van Dijck anad Poell (2015) argue that to independence it should be added the value of "not-for profit", which refers to using surplus revenues toward achieving its public goals rather than distributing them as profit or dividends. This is a fundamental issue. Media, in fact, can constitute a public sphere only if non-commercial (Fuchs, 2015). For instance, social media are not just communication companies but also advertisement agencies. There are indeed several problems of how capitalist media limit the public sphere, in particular media concentration, infotainment and power inequalities (Ibid). Most PSMs in Europe are also struggling with funding and the need to make profit.

Secondly, a fundamental debated value is diversity (Helberger, 2012; Napoli & Karppinen, 2013; Sorensen and Schmidt, 2016). A well-functioning democracy has been associated with the extent to which it facilitates the dissemination of a large array of ideas and viewpoints from a diverse range of sources, in order to foster the existence of an informed citizenry, an environment of inclusiveness and, ultimately, stable and effective self-governance (Napoli, 2001). Media pluralism is achieved when users autonomously enjoy a diverse media diet. Translating diversity into media system assessment has been the source of legal, methodological, definitional, and normative disputes for decades. The diversity principle has been also one of the key arguments for PSB in the broadcasting era as well, and its aim was to supply all citizens with a variety of content (Horowitz and Nieminen, 2017). Yet such discussions often neglect the question of how this goal should be achieved in detail (Sorensen and Schmidt, 2016). Moreover, in media policy and algorithmic recommender systems fields, diversity is approached differently. Then, many related-concepts are indeed discussed to problematize such conceptualization (horizontal vs vertical diversity, individual diversity vs diversity across people, etc.).

Even if media diversity online is generally more than in traditional media, such exposure does not always end up in an actual 'experience of diversity' (Hoffmann et al. 2015). The mere exposure to

various sources and content is generally insufficient to ensure actual experience of media diversity. Many Cognitive and affective factors that drive Internet users must also be considered. Helberger et al. (2016) argue that diversity-sensitive design without an encroachment on personal autonomy (avoiding coercion) is possible. This can be achieved if institutions are transparent about how users are being nudged and encouraged to engage in reflective thinking. Van es (2017) also argues that the normative discussion on diversity might be detrimental to focus on what publicness is and how it can be served through diversity. In sum, a renovated normative evaluation of diversity in social media is a lot more complex than the traditional policies and leaves open many questions; how can be conceptualized the experience of diversity as an ethical and, eventually, policy goal? Is there a sufficient exposure to content and sources?

Media pluralism as a normative principle actually remains vague and under-theorized, and it is not a reliable indicator of a society's level of freedom and it might also create only the illusion of content diversity (Karpinnen 2008). Moreover, in the digital age it is becoming less clear in which sense it is meaningful to speak of media pluralism, if the consumption is characterized by limitless choice. Karpinnen (2009) argues to apply the idea of 'agonistic pluralism' (Mouffe, 2000) to the context of media politics. The starting point is that media pluralism cannot be conceived only in terms of heterogeneity and a diversification of options but it needs to be analyzed in connection with the structural relations of power that define the criteria that guide information selection and limit the available choices. Such perspective helps to defend concrete institutional arrangements in media policy. PSM can indeed be seen as a key tool in creating a plurality of power structures that is more open to democratic contestation, that resists the hegemonic tendencies of the market, and that reduces 'semantic inequalities'. By analyzing digital tools that help to burst filter bubbles and decrease echo chambers, Bozdag and Van den Hoven concluded that not all democratic models are represented in these tools, and that agonistic elements should also be included so that the needs/voices of minorities can be heard. On a similar line of reasoning, Hildebrandt (2017) argues that to protect the *right to informational privacy*, it may be required what calls 'agonistic machine learning'. In other words, demanding companies or governments that base decisions on machine learning to "explore and enable alternative ways of datafying and modelling the same event, person or action".

Another fundamental value that need to be addressed is the principle of universality. This refers to universal appeal, namely to inform, inspire, entertain and appeal to the diverse interests of the young and the old, the higher and less educated, across the community. The underlying ideal is that a well-functioning democracy rests on an informed citizenry, best achieved through the simultaneous dissemination of a shared message to all citizens (Born and Prosser, 2001). Furthermore, universal appeal is considered to contribute to the nation as an 'imagined community' with a shared cultural

background and identity. the 'universality principle', which encourages to watch or listen to a bit of everything, even programs that appear uninteresting 'at first sight' (Van den bulck and Moe, 2017). Generally, it implies attention to minority interests, including high culture and educational programs. This value is strictly related to the value of publicness (van Dijck and Poell, 2015) and overall it represents what Negroponte referred as the "Daily Us".

Policymakers are exploring new ways to realize universality and publicness, especially on the Internet. In the past decade, researchers identified three complementary three main tools to realize it: (1) linear services for wide audience, (2) linear services for specific audiences and (3) explicit (user-determined) personalized public services. It appears that PSM are increasingly including another option: (4) implicit personalized public services (Van den bulck and Moe, 2017). To ensure that this fourth option fits universality and wider goals and responsibilities of PSM, there is a need for a 'public service algorithm' that takes into account in the design process serendipity, that is, to ensure that personalised services invite users to go beyond their personal interests and to expose themselves to alternative and challenging views.

The Role of Serendipity as a Novel Emerging Design Principle

Serendipity is an abstract but stable analytical category that can be used to detect and define public interests, so as to be inscribed as a design principle in digital environments and, at the same time, be used to build a sustainable strategic policy approach towards the media field (Reviglio, 2018). In fact, its design would imply diversification of information and its interactive control (Bjorneborn, 2017). Thus, it is also deeply political as it implies an empowerment of users. Also, on the one hand, it represents a more ambitious design goal rather than an undefinable diversity whereas, on the other hand, an actual compromise in the 'information overload era'. There is indeed an increasing recognition in the literature that design for serendipity has the potential to prevent the threats of filter bubbles and echo chambers (Erdelez and Yadamsuren 2016; McCay-Peet and Toms 2017). In the last couple of years, extensive accounts on how to research serendipity in digital environments (McCay-Peet and Toms 2017), how to cultivate it (Makri and Race 2016), and the role of incidental exposure to online news on users (Erdelez and Yadamsuren 2016) provided the ground for novel studies. In particular, it is nowadays researched the increasing role of accidental news consumption for the formation of individual and public opinion. Most of the studies on serendipity focus particularly on scientific discovery rather than on everyday serendipity. Yet, accidental encountering is indeed an integral part of everyday information behavior (Erdelez 2004), also called micro-serendipity (Bogers and Björneborn 2013).[7]

[7] - A study found that 80 percent of users stumbled upon news several times a week while doing other things online

Media researchers have indeed largely ignored such phenomenon for a long time, probably due to the obvious difficulty in capturing it. In recent year, however, more studies started to explore how individuals obtain information accidentally and opportunistically, rather than mostly purposively. This phenomenon is called Incidental Exposure to Online News (IEON) and it refers to "a memorable experience of a chance encounter with news (news relevant to an individual's information needs/interest or surprising news) while the individual is using the Internet for news browsing or non-news-related online activities". In other words, it is a potentially serendipitous encounter of online news. While serendipitous encounters may not be online news, online news may not be eventually serendipitous. It helps, nonetheless, to understand the significance as well as the dynamics of serendipity in social media.

IEON can better account for the change that the Internet brought to the media landscape, in particular for the irregular emerging practices of news consumption. The majority of studies on IEON in media audiences are based on the concept of incidental learning. Erdelez and Yadamsuren (2016) demonstrate that IEON is a promising behavior to encourage in the online environment. In general, it may have a positive role in informing citizens and facilitating people's political participation (Kim et al., 2013). However, this conclusion is tempered by the subjectivity of the concept of news (i.e. soft news vs hard news). In fact, IEON may even increase existing gaps in political participation between people who prefer news and people who prefer entertainment online. This, however, highlights the importance to sustain IEON through PSM core values that would tend towards hard news, especially because it seems that younger people and those less interested in news the effect of incidental exposure is stronger (Fletcher and Nielsen, 2018). Of course, there are many still many limitations in this new field of study. Because information behavior varies so much across people, situations, and objects of interest research is not easily generalizable. Yet it informs how to experiment and, eventually, implement serendipitous PSM's architectures for social media.

It has been already argued that a core function of traditional media is to provide 'reliable surprises' in order to balance familiarity (personalization) and chaos (randomization) (Schoenbach 2007). Eventually, institutions could design for serendipity to tackle the challenges of experiencing diversity in social media (Reviglio 2017). Sunstein (2017) proposed to build an architecture of serendipity as it would sustain 'chance encounters and shared experiences', considered as preconditions for a well-functioning democracy. Moreover, Hildebrandt (2017) argues that the self is not computable and such 'incomputable nature of the self' should be somehow protected. In fact, not only no personal profile can ever entirely identify us, but there are always many – and sometimes radically different – ways of computing the same person. Therefore, there is a need for an institutional mediation of

(Purcell et al. 2010).

personalization. In addition, it has been stressed the importance to design decision-support systems with a view of regularly 'jolting us out of our moral torpor' in order to sustain the unavoidable need for moral change (Delacroix, 2018).

Eventually, in social media serendipity would be generally intended to achieve three main goals (Reviglio 2018); on the one hand, to design serendipity into recommender systems. Hence, 1. to provide content that intersect users' profile, so that a user might discover *new interests*, outside of their filter bubble, 2. to provide content that is politically challenging, eventually resulting in a serendipitous information encounters (*belief change*), thus minimizing the effects of echo chambers with an agonistic approach. On the other hand, it is intended, more generally, as 3. to cultivate serendipity by design, i.e. throughout empowering tools to randomize, control and be aware of the production and consumption of information. This might also imply to consider *interconnectivity* and *interoperability,* that are essential novel principles for contemporary media and communications policymaking (Picard and Pickard, 2017).

2.3 A Counter-Architecture for Serendipity in Social Media?

Based on the previous analysis, a preliminary design architecture for serendipity implementable on the top of platforms architecture (what is referred to 'counter-architecture') will be now discussed. Focusing on a user-centric perspective, it is argued that a renovated PSM should also provide affordances and tools for social media usage according to PSM goals and values.

There are endless ways to empower users, extract value from their profiles meaningfully, to illustrate connections, increasing diversity, and to stimulate creative and serendipitous associations. In many cases, designing for serendipity is indeed a form of nudging. Yet it is also possible to nudge users without introducing manipulative measures (Helberger et al. 2016). Such approach is embraced by Floridi (2016), who advocates what he calls 'pro-ethical design' which aims to modify the level of abstraction of the choice architecture by educating users to make their own critical choices and to assume explicit responsibilities. This means to nudge and empower individuals, along two main design choices, default rules and active choosing (Sunstein, 2017). However, given the limited space of this paper, it is not possible here to discuss in deep the ethical and political consideration of such debate. To put it simply, an architecture for serendipity only based on active choices is far less disputable and it might be implemented technically much more easily. This would be based mainly on providing *control* and *awareness* of information production and consumption. In practice, this means to design a *counter-architecture*, supplemented with *discovery and visualization tools* so as to eventually providing it freely as a comprehensive plug-in browser extension.

A notable example of a 'counter-architecture' in social media functioning is *Social Fixer*[8], a plug-in that improves design choices and filters in Facebook (Fig.1). Written with Javascript language with *Greasymonkey*[9] by only one designer, it permits several radical changes in your everyday social experience. For example, it can force Facebook's NewsFeed to switch to "Recent Stories First" – the chronological feed, which is presumably algorithmically not curated. By default, in fact, Facebook only shows you the top stories rather than every post made by your friends. Yet anytime one logout the website the newsfeed reset by default the algorithmic curation. Such simple design choice would already free users from the algorithmic influence of Facebook, and it is presumably more serendipitous as well. Another relevant change one may decide is to disable the auto-loading of posts. Hence, one can decide to scroll, to say, 50 posts anytime one login, without being captured in the endless stream of content. Either, it might be possible to hide any metrics' posts in order to don't get into so-called 'trendism'.[10] This could really help users to self-control their attention, their social influence and their potential addiction or even reduction of diversity. In its current version, however, Social fixer does not function on smartphones, which are nowadays the most used device to access social media.

Fig.1 Overview of the settings of Social Fixer, a browser plug-in for Facebook.

[8] - See https://socialfixer.com/

[9] - Greasemonkey is a userscript manager made available as a Mozilla Firefox extension. It enables users to install scripts that make on-the-fly changes to web page content after or before the page is loaded in the browser (also known as *augmented browsing*).

[10] - See https://medium.com/@enkiv2/against-trendism-how-to-defang-the-social-media-disinformation-complex-81a8e2635956

Regarding visualization tools, a notable example is the visualization design developed by Nagulendra and Vassileva (2014; 2016) which displays to users their filter bubbles, showing them which categories and friends are in their bubble and which ones are not, allowing them to control the algorithm by manipulating the visualization to escape the bubble, by adding or removing friends on a certain topic to the filters (Fig.2). The results are promising given that 72 % of participants said that it was easy to find an interest which was not inside their filter bubble, so that they were able to discover new interests that they didn't display otherwise in their behavior. Unfortunately, to the knowledge of the author this is the only attempt to show filter bubbles to users. Yet the quality of the design can certainly be improved and expanded.

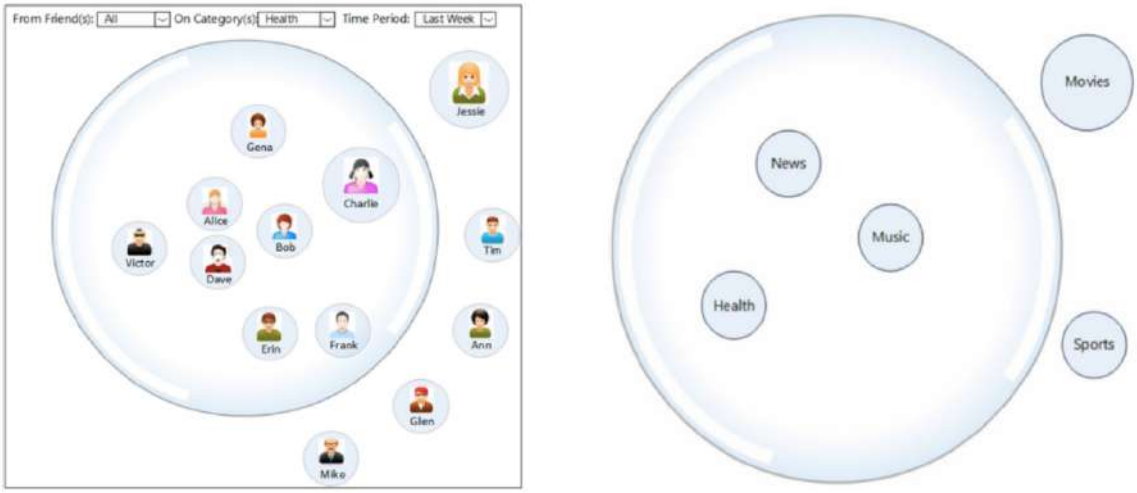


Fig.2 Nagulendra and Vassileva (2014; 2016)

Regarding discovery tools, a fruitful example is represented by the MIT Media lab website *Gobo*, an open source social media news aggregator with sliders that users can control to filter information (Fig.3)[11]. This project sheds the light not only on the possibility to provide sliders to filter media content based on certain end-norms but, more interestingly, the possibility of re-filter the information a user might want to consume in social media. Hence, it implies – to some extent – the power to bypass the algorithmic curation of information intermediaries. Of course, it has serious limitations. Firstly, the content filtered is shared by public groups and there are not friends' posts. Yet, one may imagine the possibility to include also friends' posts by receiving their permission. Secondly, because of their recent API changes, it is not currently working on Facebook. However, technical solution might be found and the project could be eventually replicated according to PSM values mediated by the role of serendipity. [12]

[11] - https://github.com/mitmedialab/gobo

[12] - To make a couple of examples, filters that might be considered are the following: *interests* (from personalization (daily me), generalization (daily us), to randomization), *political perspective* (from my perspective, a lot of perspectives, to 'counter-perspectives'), *mood* (from entertainment (images, short video etc.) to *seriousness* (text, long video etc.)), but also *time* and *space* such as *place* (from local to global) and/or *network* (from strong ties to weak ties). These are only

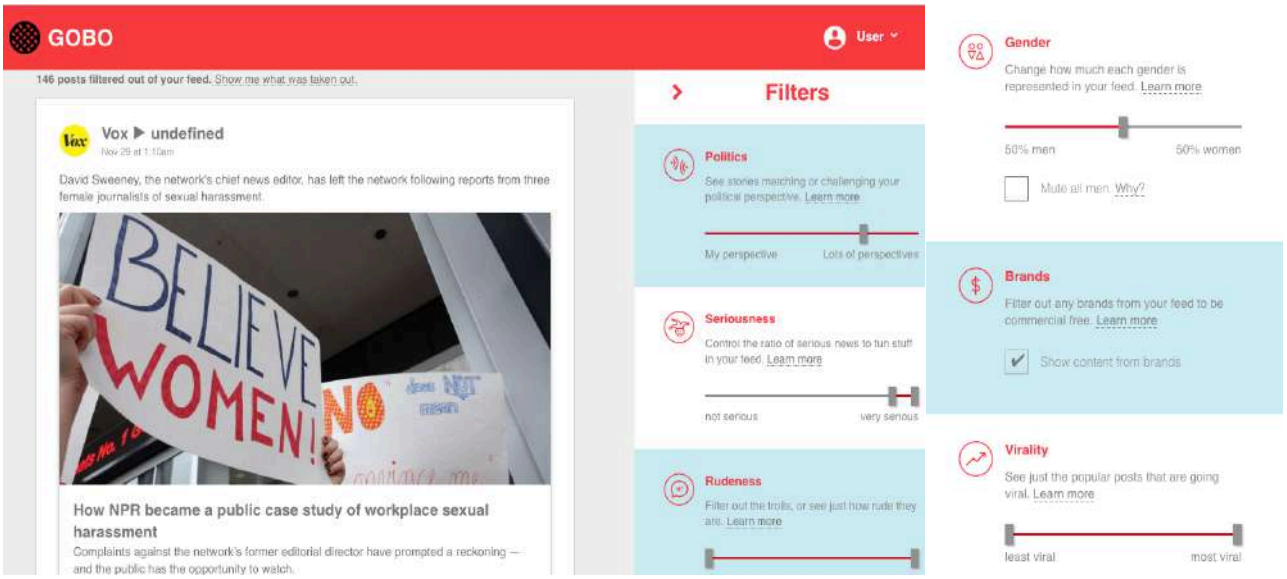


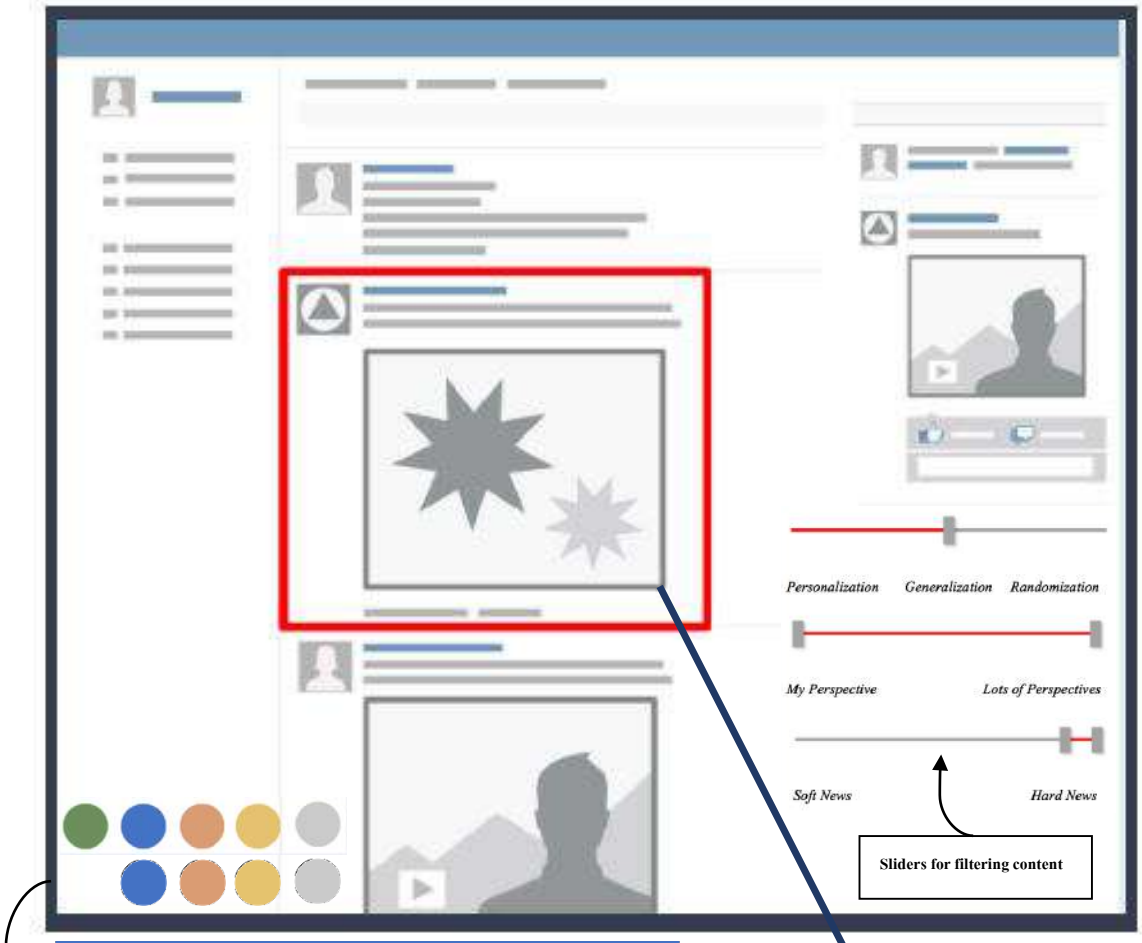
Fig.3 Overview of the filters of Gobo, a social news aggregator for Facebook and Twitter.

Yet, *Interactivity* might threaten the principle of universality (van Es, 2017). Because of the focus on what consumers want to consume, in fact, diversity and universality are often rejected (Caplan and boyd, 2016). It is important to recognize, however, that broadcasting and interactivity/choice are not mutually exclusive (Bennett, 2006). There is, of course, a clash between 'pre-selected personalization' as opposed to 'self-selected personalization' (Zuiderveen Borgesius et al., 2016). This again recalls the two main approaches for nudging (Sunstein 2017). There are, in fact, ethical and political issues involved. From a design perspective, however, it is possible to supplement such interactive control with other tools, techniques and design choices in order to increase consumption awareness. For instance, so-called information nutrition labels (Gollub et al., 2018) and gamification techniques to reward people that embrace PSM values, such as high-quality content, slow consumption, social cohesion etc.

Aside from considering how social values might be translated into specific measures, institutions need also to maintain trust, which requires that they must be genuinely accountable. Important in this regard is the new General Data Protection Regulation (GDPR), an effort to standardize data protection regulation within the EU, extends regulation in an effort to ensure data transparency and accountability. Even EBU explicitly addresses accountability. Accountability is addressed in the principles Understanding, Transparency and Together; understanding concerns explaining to users how data is collected and used and how this benefits the users. Likewise, transparency concerns informing viewers about what data is collected and used, but it also enables them 'to access, rectify and delete their personal profile' (EBU, 2017: 13). Yet, what is actually required for these ambitions to be met remains vague, for both EBU and social media.

---

speculative sliders. They certainly need a theoretical and technical discussion as well as an empirical demonstration to be able to expose users to more diverse information.



Metrics on 'Information Diet Awareness' and Attention Management

N. Post scrolled – Articles read – Images seen – Video watched

+ Their percentage

+ Average of the type of content consumed

+ Suggested 'healthy percentage'

In addition, it might be considered other metrics to increase awareness:

Time spent and Post to be scrolled (max N.x)

Dimension	Category	Quantity	Range	Addressed User Question
Readability Technicality Verbosity*	I Effort	Time	0 - 120 min	Does time allow the reading?
Topicality Virality	II Kairos	Temperature	0 - 100 °C	Do others care?
Factuality Verifiability*	III Logos	Transparency	0 - 100 %	How professional is the writing?
Emotion Opinion Controversy	IV Pathos	Sound pressure	0 - 120 dB	Is the article subjective?
Authority Credibility Trust	V Ethos	Credit rating	class A+...D	How reliable is the source?

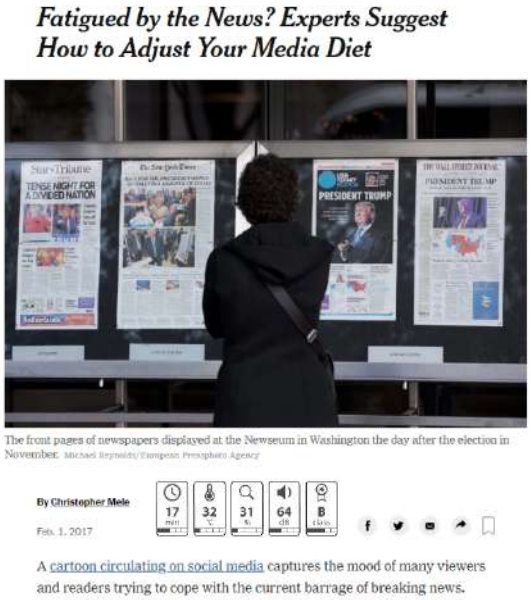


Fig.4. A speculative example of certain affordances and Information Nutrition Labels (taken from Gollub et al. 2018)

The shift from PSB to PSM, from public space to public value, and from content production to content selection and distribution require an international dialogue between creative producers, policy-makers, and academics to develop new perspectives on public value and on the technologies and practices through which such values should be created and facilitated (van Dijck anad Poell, 2015). In summary, the transformation in the media landscape is increasingly compelling PSM to reinvent itself. It is argued that there is room to let PSM experiment and design a sort of counter-architecture for mainstream social media to 1. supplement users' experience, educate them to proactively manage the production and consumption of information by empowering them with effective visualization, attention management and discovery tools and 2. to collect knowledge and know-how on designing information architecture based on the principles of PSM, to experiment 'serendipitous algorithms', to apply them either in PSBs websites, either in a public social media.

4. Limitations and Further Challenges

Despite obvious technical, economic and political challenges, there are certainly limitations concerning the outlined preliminary framework for a counter-architecture for serendipity in social media. First of all, its effectiveness. As discussed above, interactivity might indeed threaten the principles of publicness and universality and not fulfil the goal of maintaining a common sense and belonging. For this reason, one might actually argue the need for such architecture to be implemented by default to having better capacity to nudge users towards the PSM's values. The political consequences of exposure to dissimilar views have long been a subject of polarization research, but findings are largely mixed (Lee et al., 2014). For example, polarized individuals polarize further while exposed to challenging information (Quattrociocchi and Sunstein 2016). Another related-risk is that users do not exploit such tools – they do not always want to be in control – so that the system might even legitimize further sophisticated personalized design and filtering. Yet, it is too early to understand information behaviour. This certainly requires more understanding as media landscape changes rapidly and steadily. It is not possible to make harsh generalizations. This challenge should push institutions to start experimenting in order to understand the opportunities of serendipitous architectures and to minimize potential negative consequences.

Furthermore, values involved in design should be discussed further and in relation to an actual architecture. For instance, to reach a viable accountability it is advocated an open-source and participatory architecture. This, however, it may give the opportunity to other actors to exploit such architectures for other potentially malicious reasons. Moreover, the design for serendipity may have other detrimental effects and trade-offs (Reviglio, 2018). Indeed, it may decrease the accuracy of

recommendations. More generally, the efficiency of the system, putting at risk users' trust, engagement and satisfaction. There are also privacy concerns. Overall, it is not a trivial task design for PSM's values mediated by serendipity but it might nonetheless represent a constructive experimentation for designers, ethicists and policy-makers. It has to be taken into consideration that the potential for a co-regulation with platforms, as well as a potential conflict of interests of PBSs.

Finally, public institutions need to address how to legitimize a policy intervention. Actually, there has been relatively little discussion at this point of useful theoretical frameworks for understanding algorithms and their role in contemporary media systems. Napoli (2014) argues that an institutional orientation toward algorithms and their role in the dynamics of media production and consumption seems appropriate. There are, in fact, likely practical policy implications that arise from approaching algorithms and their functionality from an institutional perspective. For instance, an institutional perspective on algorithms may provide a more compelling basis from which policymakers, scholars, and policy advocates can justify regulatory interventions or even the imposition of public service obligations of one form or another. Algorithmically-driven organizations such as Google and Facebook have indeed resisted being characterized as media companies. Such rhetorical positioning can easily be interpreted as an effort to minimize the risks of policy interventions (Napoli, 2001).

Furthermore, a rights-based approach can help to legitimize a policy intervention, as it is implicitly at the core of PSM (Boev, 2011; Horowitz and Nieminen, 2017). PSM could indeed be the trusted gatekeepers and pro-active creators of communication rights. Scholars (van Cuilenburg and Mcquail, 2003) and organizations such as the Council of Europe (CoE, 2011) have begun to frame PSM as the organizations most capable of ensuring communication and human rights. The counter-architecture outlined above could strengthen human rights, in particular the right to informational self-determination (more generally personality rights). More specifically, the *right to receive information* (see Eskens et al. 2017), the *right not to be deceived*, which means to be treated with dignity and respect and not to be manipulated and "hyper-nudged" by means of big data (Yeung, 2017) and, last but not least, privacy.

Conclusions

Public Service Media is adapting to the digital revolution. Yet, its novel emerging role is at a crossroad. There are many opportunities to explore and challenges to face, particularly regarding the risks of personalization and addictive and superficial consumption of information in social media. It is possible, in fact, to experiment the effectiveness of various tools and, eventually, to freely provide them to users, promisingly through EU institutions. For example, such tools might take the shape of

a browser extension with a social news aggregator, and discovery and visualization tools, able to by-pass social media's design, and accessible to worldwide users without having to legally deal with platforms themselves. Yet, to reach and empower all citizens it is advocated to implement what has been defined as a counter-architecture for serendipity based on a re-evaluation of PSM values, notably no-profit, accountability (in particular open-source), users' participation and serendipity.

Limitations and further challenges have been also discussed. Above all, the outlined framework certainly needs further empirical research to demonstrate its effectiveness. There is, nonetheless, room to design architecture able to nudge users according to PSM's value. Yet, design values need to be analyzed more systematically. So far, it has argued that traditional values such as universality, publicness, interactivity and diversity might be mediated and reinforced by serendipity. Of course, legitimizing such proposal is not a trivial task. An institutional analysis of algorithms and right-based approach have been indicated as promising theoretical frameworks. Moreover, one should not overly romanticize PSMs as they can be criticized on many respects. In this paper, however, an initial attempt to advocate a novel and practical role of Public Service Media has been made.

In sum, in the era of social media PSM may not only provide (high-quality) content and online services. Rather, it could provide effective tools to filter existing one as to act as a general-interest intermediary in order to maintain an open access to a "social daily us", sustaining users' attention and curiosity, while defending the rights to receive information and not to be deceived. Democratic governments should take into consideration to provide such unobtrusive digital architecture that empowers internet users in criticizing the same institutions that provides such affordances. PSMs have a good chance of becoming trusted brands in the new ocean of news, information and opinions offered by ICTs. Many PSB institutions have already undergone considerable changes indeed, but these have tended to be evolutionary rather than revolutionary and, in most cases, have not led to major improvements in the position of public broadcasters. From a pragmatic perspective, empower users in the attempt to nudge them to information diversity might be a sufficient policy goal in the personalization era. Unless, the most appealing solution is that institutions like the EU begins to seriously think about a Public Social Media.

References:

Ahmadi, M., & Wohn, D. Y. (2018). The Antecedents of Incidental News Exposure on Social Media. *Social Media+ Society*, 4(2), 2056305118772827.

Bárd, P., & Bayer, J. (2016). A Comparative Analysis of Media Freedom and Pluralism in the EU Member States.

Bardoel, J., & Lowe, G. F. (2007). From public service broadcasting to public service media: The core challenge. *From public service broadcasting to public service media*, 9-26.

Bardoel, J., & d'Haenens, L. (2008). Reinventing public service broadcasting in Europe: prospects, promises and problems. *Media, Culture & Society*, 30(3), 337-355.

Bennett, J. (2018). *Public Service Algorithms*. In D. Freedman, & V. Goblet (Eds.), A future for public service TV (pp. 112-120). London: University of Goldsmith Press.

Bodo, B., Helberger N., Irion, K., Zuiderveen Borgesius F., Moller, J., van der Velde, B., Bol, N., van Es, B., de Vreese, C. (2017). Tackling the Algorithmic Control Crisis-the Technical, Legal, and Ethical Challenges of Research into Algorithmic Agents. *Yale JL & Tech*., 19, 133-182.

Bogers, T., & Björneborn, L. (2013). Micro-serendipity: Meaningful coincidences in everyday life shared on Twitter. *iConference* 2013, 196-208.

Born, G., & Prosser, T. (2001). Culture and consumerism: Citizenship, public service broadcasting and the BBC's fair trading obligations. *The Modern Law Review*, 64(5), 657-687.

Bozdag, E., and van den Hoven, J. (2015). Breaking the filter bubble: democracy and design. *Ethics and Information Technology*, 17(4), 249-265.

Burri, M. (2015). Contemplating a 'Public Service Navigator': In Search of New (and Better) Functioning Public Service Media. In *International Journal of Communication*, 9, 1341–1359.

Carson, A. B. (2015). Public Discourse in the Age of Personalization: Psychological Explanations and Political Implications of Search Engine Bias and the Filter Bubble. *Journal of Science Policy & Governance*, 7(1).

Corneli, J., Jordanous, A., Guckelsberger, C., Pease, A., & Colton, S. (2014). Modelling serendipity in a computational context. *arXiv preprint arXiv*:1411.0440.

Delacroix, S. (2018). Taking Turing by Surprise? Designing Digital Computers for morally-loaded contexts. *arXiv preprint arXiv*:1803.04548.

Del Vicario, M., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., ... & Quattrociocchi, W. (2016). The spreading of misinformation online. *Proceedings of the National Academy of Sciences*, 113(3), 554-559.

DeVito, M. A. (2017). From editors to algorithms: A values-based approach to understanding story selection in the Facebook news feed. *Digital Journalism*, 5(6), 753-773.

EBU Digital Strategy Group (2002). Media with a Purpose: Public Service Broadcasting in the Digital Age. Geneva: EBU.

EBU (2012). "Empowering Society: A Declaration on the Core Values of Public Service Media." [Retrieved 23 August 2018 at http://www3.ebu.ch/cms/en/policies/initiatives/psm-values]

EBU (2016). Big Data Initiative Workshop – Algorithms and Society. [Retrieved 23 August 2018 at: https://www.ebu.ch/contents/events/2016/12/big-data-initiative-workshop-algorithms-and-society.html]

EBU (2017) Big Data Initiative: Time to Invest. Le Grand-Saconnex.

Erdelez, S. (1997). Information encountering: a conceptual framework for accidental information discovery. *In Proceedings of an international conference on Information seeking in context* (pp. 412-421). Taylor Graham Publishing.

European Commission (2007). In Media pluralism in the member states of the European Union (pp.1–91). Brussels, Belgium.

Feezell, J. T. (2017). Agenda Setting through Social Media: The Importance of Incidental News Exposure and Social Filtering in the Digital Era. *Political Research Quarterly*, 1065912917744895.

Fletcher, R., & Nielsen, R. K. (2018). Are people incidentally exposed to news on social media? A comparative analysis. *New Media & Society*, 20(7), 2450-2468.

Floridi, L. (2016) Tolerant paternalism: Pro-ethical design as a resolution of the dilemma of toleration. *Science and engineering ethics*, 22(6), 1669-1688. 29.

Fuchs, C. (2015). Social media and the public sphere. *TripleC: Open Access Journal for a Global Sustainable Information Society*, *12*(1), 57-101.

Fuchs, C. (2017). Towards the Public Service Internet as Alternative to the Commercial Internet. *ORF Texte*, 20, 43-50.

Gal, M. S. (2017). Algorithmic Challenges to Autonomous Choice. *Michigan Telecommunications and Technology Law Review*, 2017.

Gollub, T., Potthast, M., & Stein, B. (2018). Shaping the Information Nutrition Label. In *Proceedings of the NewsIR'18 Workshop at ECIR.*

Gibson, J. J. (2014). *The ecological approach to visual perception: classic edition.* Psychology Press, Hove, UK.

Kim, Y., Chen, H. T., & De Zúñiga, H. G. (2013). Stumbling upon news on the Internet: Effects of incidental news exposure and relative entertainment use on political engagement. *Computers in human behavior*, 29(6), 2607-2614.

Helberger, N. (2012). Exposure diversity as a policy goal. *Journal of Media Law*, 4(1), 65-92.

Helberger, N., Klein-von Königslöw, K., & van der Noll, R. (2014) Convergence, information intermediaries and media pluralism—Mapping the legal, social, and economic issues at hand. A quick scan. *Institute for Information Law, Research Report.*

Helberger, N., Karppinen, K., & D'Acunto, L. (2016). Exposure diversity as a design principle for recommender systems. *Information, Communication & Society*, 1-17.

Hildebrandt, M., & Koops, B. J. (2010) The challenges of ambient law and legal protection in the profiling era. *The Modern Law Review*, 73(3), 428-460. 26.

Hildebrandt, M. (2017). Privacy as Protection of the Incomputable Self: Agonistic Machine Learning.

Hoffmann, C. P., Lutz, C., Meckel, M., & Ranzini, G. (2015). Diversity by choice: Applying a social cognitive perspective to the role of public service media in the digital age. *International Journal of Communication*, 9(1), 1360-1381.

Horowitz, M. A., & Nieminen, H. (2017). Diversity and Rights. Connecting Media Reform and Public Service Media. *IC-Revista Científica de Información y Comunicación*, (14), 99-119.

Karppinen, K. (2008). Media and the paradoxes of pluralism. *The media and social theory*, 27-42.

Kotkov, D., Wang, S., & Veijalainen, J. (2016) A survey of serendipity in recommender systems. *Knowledge-Based Systems*, 111, 180-192. 36.

Lee, J. K., Choi, J., Kim, C., & Kim, Y. (2014). Social media, network heterogeneity, and opinion polarization. *Journal of communication*, 64(4), 702-722.

Lerman, K., Yan, X., & Wu, X. Z. (2016). The" majority illusion" in social networks. *PloS one*, 11(2), e0147617.

Lynch, M. P. (2016). *The Internet of us: Knowing more and understanding less in the age of big data*. WW Norton & Company.

Matt, C., Benlian, A., Hess, T., & Weiß, C. (2014) Escaping from the Filter Bubble? The Effects of Novelty and Serendipity on Users' Evaluations of Online Recommendations. 34. In *Thirty Fifth International Conference on Information Systems, Auckland 2014.*

McCay-Peet, L., & Toms, E. G. (2013). Proposed facets of a serendipitous digital environment. In *Teoksessa iConference 2013 Proceedings*, ss. 688–691.

McCay-Peet, L., & Toms, E. G. (2017). Researching serendipity in digital information environments. Synthesis Lectures on Information Concepts, Retrieval, and Services, 9(6), i-91.

Mouffe, C. (2000). *Deliberative democracy or agonistic pluralism*. Wien: Institut für Höhere Studien (IHS), Wien.

Nagulendra, S., & Vassileva, J. (2016). Providing awareness, explanation and control of personalized filtering in a social networking site. *Information Systems Frontiers*, 18(1), 145- 158.

Napoli, P. M. (2014). Automated media: An institutional theory perspective on algorithmic media production and consumption. *Communication Theory*, 24(3), 340-360.

Napoli, P. M. (2011). *Audience evolution: New technologies and the transformation of media audience*s. Columbia University Press.

Napoli, P. M. (1999). Deconstructing the diversity principle. *Journal of Communication*, 49(4), 7-34.

Negroponte, N. (1996). *Being digital*. Vintage. New York.

Pariser, E. (2011). *The filter bubble: How the new personalized web is changing what we read and how we think*. Penguin. New York.

Pentina, I., & Tarafdar, M. (2014). From "information" to "knowing": Exploring the role of social media in contemporary news consumption. *Computers in Human Behavior*, 35, 211-223.

Picard, G., & Pickard, V. (2017). Essential Principles for Contemporary Media and Communications Policymaking. *Reuters Institute for the Study of Journalism*: University of Oxford.

Powers, E. (2017). My News Feed is Filtered?: Awareness of news personalization among college students. *Digital Journalism*, 5(10), 1315- 1335

Purcell, K., Rainie, L., Mitchell, A., Rosenstiel, T., & Olmstead, K. (2010). Understanding the participatory news consumer. *Pew Internet and American Life Project*, 1, 19-21.

Race, T. and Makri, S. (2016) *Accidental Information Discovery: Cultivating serendipity in the Digital Age*. Chandos Publishing. 35.

Reviglio, U. (2017). Serendipity by Design? How to Turn from Diversity Exposure to Diversity Experience to Face Filter Bubbles in Social Media. In *International Conference on Internet Science*, 281-300. Springer, Cham.

Reviglio, U. (Forthcoming). Serendipity as an Emerging Design Principle of the Infosphere: Challenges and Opportunities.

Tucker, J., Guess, A., Barberá, P., Vaccari, C., Siegel, A., Sanovich, S., ... & Nyhan, B. (2018). Social Media, Political Polarization, and Political Disinformation: A Review of the Scientific Literature.

Schönbach, K. (2007). 'The own in the foreign': reliable surprise-an important function of the media?. *Media, Culture & Society*, 29(2), 344-353.

Shirky, C. (2009). A speculative post on the idea of algorithmic authority. [Accessed August 23, 2018 at http://www.shirky.com/weblog/2009/11/a-speculative-post-on-the-idea-of-algorithmic-authority/]

Sørensen, J. K., & Schmidt, J. H. (2016). An Algorithmic Diversity Diet?: Questioning Assumptions behind a Diversity Recommendation System for PSM. *RIPE@2016,*

Splichal, Slavko. 2007. Does History Matter? Grasping the Idea of Public Service at its Roots. In *From Public Service Broadcasting to Public Service Media*. RIPE@2007, ed. Gregory Ferrell Lowe and Jo Bardoel, 237-256. Gothenburg: Nordicom.

Sunstein, C. R. (2015). Nudging and choice architecture: ethical considerations. *Yale J Regul*.

Sunstein, C. R. (2017). *#Republic: Divided Democracy in the Age of Social Media.* Princeton University Press.

Tang, T. Y., & Winoto, P. (2016). I should not recommend it to you even if you will like it: the ethics of recommender systems. *New Review of Hypermedia and Multimedia*, 22(1-2), 111-138.

Tambini, D. (2004). Passing of paternalism: public service television and increasing channel choice. *NHK Broadcasting Studies*, 3.

Van Cuilenburg, J., & McQuail, D. (2003). Media policy paradigm shifts: Towards a new communications policy paradigm. *European journal of communication*, 18(2), 181-207.

Van Dijck, J., & Poell, T. (2015). Making public television social? Public service broadcasting and the challenges of social media. *Television & New Media*, 16(2), 148-164.

van Es, K. F. (2017). An Impending Crisis of Imagination: Data-Driven Personalization in Public Service Broadcasters. *Media@ LSE Working Paper Series*, (43), 1-18.

Vicario, M., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., Quattrociocchi, W. (2016). The spreading of misinformation online. *Proceedings of the National Academy of Sciences*, 113(3), 554-559.

Yadamsuren, B., & Erdelez, S. (2016). Incidental exposure to online news. *Synthesis Lectures on Information Concepts, Retrieval, and Services*, 8(5), i-73.

Zuboff, S. (2015). Big other: surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology*, 30(1), 75-89.

Zuiderveen Borgesius, F. J., Trilling, D., Moeller, J., Bodó, B., De Vreese, C. H., & Helberger, N. (2016) Should We Worry About Filter Bubbles?. Internet Policy Review. *Journal on Internet Regulation*, 5(1).