



Improving User Experience by Browser Extensions: A New Role of Public Service Media?

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Abstract. The paper questions the role of public service media in the digital era. The Internet has in fact disrupted previous patterns of production, distribution and consumption of information. Concerns arose on social media effects on well-being and how mainstream platforms design affects information consumption. The paper is an interdisciplinary contribution structured as follows. Firstly, it critically analyses the risks resulting from social media's usage, with a special focus on personalization practices. Then, it explores the development of Public Service Broadcasting and questions the role that Public Service Media (PSM) has to sustain media quality, information diversity and, more generally, its traditional values. Thus, arguments in favor of a renovated and proactive role of Public Service Media are provided. In particular, an agonistic approach to social media, an 'architecture for serendipity' and the role of attention management are advocated. Finally, drawing from information architecture and nudging theory, the paper introduces the concept of 'meta-design' as the ability to re-shape a digital environment by browser extensions in order to change design choices as well as to inform and educate users. The conclusion is that improving user experience by meta-design can actually represent a novel experimental role for PSM and, eventually, a soft regulatory tool for sustaining individuals and the general public interest.

Keywords: Public service media · Social media · Design · Nudging · Browsers

1 Introduction

Online communication is at a critical juncture that entails global phenomena such as polarized news coverage, hate speech, misinformation and, more generally, market concentration and the crisis of journalism [1–3]. In particular, there are several negative effects of social media on well-being [4]. Moreover, personalization of media content can limit the access and the exposure to diverse information [4, 5] and, as a result, weakening democracy [6]. Also, there are increasing concerns about the potential usage of persuasive and 'hyper-nudging' techniques that threaten the autonomy of users [7, 8]. As a reaction to this emerging media environment, policy-makers, designers, engineers and ethicists are discussing potential solutions. Yet, for many reasons the

risks and consequences of the Internet and its usage are very hard to prove [9] and, eventually, to counteract, especially regarding algorithms, personalization and so-called filter bubbles [10].

Much has been discussed about the role of public service media in the digital era [11–15]. Apart from relatively few examples, however, Public Service Broadcasting (PSB) and its digital version Public Service Media (PSM) have never been at the center of media reform activities. Despite the urgency to find new strategies, PSM would need to take shape in a concrete manner. So far, such inability to evolve has actually represented an impending ‘crisis of imagination’ [16]. Thus, the article aims to address the following key issues; what might be the role of PSM in the emerging media landscape? Can it represent an institutional mediator able to proactively help solve media crisis and, more generally, reinforce democracy and human rights? How can PSM concretely counteract the detrimental principles that shape social media today such as superficiality and hedonism, while sustaining media pluralism and PSB traditional values, such as diversity, universality, publicness and quality?

The paper is a theoretical and interdisciplinary contribution structured as follows. In Sect. 2, the paper analyses the risks of social media with a special focus on media pluralism and personalization. Contrary to recent research minimizing phenomenon such as filter bubbles, arguments in favor of a precautionary approach are indeed provided. In Sect. 3, after a close examination of its evolution, the paper questions the role that PSM has in the current social media landscape. Approaches to favor a renovated and proactive role of PSM are then discussed in Sect. 4. Subsequently, in Sect. 5, drawing from insights on information architecture and nudge theory, paradigmatic browser extensions and aggregators are briefly presented to eventually frame the concept of *meta-design*. To conclude, limitations are critically explored and final considerations are made in Sect. 6.

2 The Internet, Social Media and ‘Diversity Exposure’

The Internet constitutes a significant challenge to established media policies and the role of PSB. With large media providers no longer serving a gatekeeping function, the consumption of information turned on the choices of individual users and algorithms. Existing models of information and news production, distribution and consumption have thus radically changed. Social media, in particular, is nowadays at a critical juncture that entails global phenomena such as polarized news coverage, hate speech, misinformation and, more generally, users’ data exploitation, market concentration and the crisis of journalism [1–3]. More broadly, there are increasing concerns that social media can have several detrimental effects on well-being [7].

Above all, in order to provide relevant information to users, the epochal transition from information scarcity to information abundance brought the need for a balance between a pull and a push approach [17], between explicit and implicit personalization [18]. In other words, between autonomy of choice and algorithmic/platform delegation. Online personalization indeed performs a fundamental role of knowledge management to restrain information overload, reduce complexity and satisfy individuals as well as preserve their time and attention. It is, however, an imperfect tool subject to political

and commercial manipulations. The landscape of today's social media is indeed characterized by an oligopolistic market in which users' attention is treated as a commodity in what has been described as 'surveillance capitalism' [1]. This small group of platforms act as the ultimate gatekeepers for billions of users worldwide. They provide personalized experiences (mostly implicit) but very little control over the information filtering processes [17, 18]. As such, short-term pleasure, soft news, homophily, entertainment and advertisement occupy a privileged place.

Academic literature describes how online content personalization can limit diversity, and create filter bubbles at individual level [4] and echo chambers at group level [3]. The major concern is that users may 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 could reduce opportunities to self-determination as well as their ability to build productive social capital [4]. At the collective level, media pluralism could be weakened as well. Thus, the audience become increasingly fragmented and people – especially the less skilled and literate – become more politically polarized and vulnerable to censorship and propaganda [3]. Media pluralism and autonomy of choice can indeed be threatened, and so can democracy.

Currently, however, research is contradicting, ambiguous and, to some extent, unreliable [9–11, 20]. The risks of social media usage [9] and personalization [10, 21], in fact, are very hard to prove and, eventually, to counteract. Most research is often inconsistent and inconclusive, mainly because it is based on small or unsatisfactory samples. In the light of the rapidly changing media landscape many studies quickly become out-dated. Platforms are indeed constantly changing their algorithms and business models. There is a crisis on the study of algorithms [10]. Significant gaps in research remain as well as in a consensus on a common set of definitions [20]. While insights on the main causes and risks are currently known [9] little is known about the extent of these consequences and the potential socio-technical solutions. Of course, many proposals to counteract such risks have been discussed. While some have focused on improving diversity by design [13], others focused on users behavior and media literacy [19]. In any case, there has not been sufficient evidence to justify any strong legal intervention.

The concept of media pluralism and diversity are intertwined and well-established democratic principles, especially in Western Europe's media research and policy since the 1960s. Indeed, the Council of Europe [21] and European Commission [22] 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 [13]. The practical implications of this policy have long been associated with PSB. Given the mutated media landscape, the paper specifically questions the role of PSM. There are still discussions on how PSB and its digital counterpart PSM can adapt and, eventually, steer its development, in particular to preserve (or even enlarge) an audience that is fragmenting and to ultimately sustain end-users to make sense of information in the digital era. Fundamental questions need to be answered so far: how can PSB and PSM still survive and maintain a relevant role in shaping the social media landscape?

In particular, in what ways might PSM sustain the consumption of diverse information and a more fruitful public discussion based on the principles that guided PSBs in the past? In other words, what are the media instruments with which PSM might intervene more effectively?

3 The Role of Public Service Media in the Digital Age

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, where the latter two are derived from the first [23, 24]: (1) Enhancing, developing and serving social, political and cultural citizenship; (2) Universality; and (3) Quality of services and output. Van Cuilenburg and McQuail [25] identified three phases in Western communication policy-making paradigms that show the evolution of these principles: (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. 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 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, which, 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 [11]. PBSs indeed changed their programs to better adapt to audiences and 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 [25].

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 [11]. Yet, it is believed that PSB should not be restricted to remedying ‘market failures’ but to respond to the needs of citizens – which are indeed different from those of consumers. Thus, not only should it 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 it increasingly difficult to attract and sustain audiences.

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)¹ followed the second path. The EBU Digital Strategy Group [26] considers PSB as an ‘island of trust’ amidst multimedia companies offering linear broadcasts and online programs. Public broadcasters 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, the transition from PSB into PSM was debated.² In general, this implied the extension of public services beyond radio and television to encompass the full specter of the Internet. As a consequence, public broadcasters were to redefine their relation to the public. One of the main challenge remained the gradually diminishing reach of PSB among minorities and ‘problematic groups’ such as younger generations, migrants and the less educated [14]. 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. Such turn to the digital environment also stimulated PSBs in Europe to experiment with a public version of “social TV”. Online participation has been considered a key-strategy to regain position in national arenas. Such commitments, though, do not appear particularly effective in shaping information consumption, and therefore are often considered insufficient.

4 Towards a New Role of PSM

Most scholars agree that PSB as well as PSM require new forms of justification, not simply to save its role as a public institution but to educate a generation grown up in a global multi-platform world. A new media policy paradigm is indeed needed, and the three main paradigms discussed earlier highlight the deterministic influence not much of technology but of social values.

Some scholars advocated alternative and radical proposals such as a ‘Public Service Internet’ [28] or ‘Public Service Algorithms’ [15, 29]. Burri [15] also advocates the

¹ EBU is an alliance of public service media (PSM) organizations, established on 12 February 1950, made up of 72 members in 56 countries, yet unrelated to European Institutions. Its main objective is to assist its Members in this period of unprecedented technological changes.

² Splichal [27] 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’*” (p. 255).

idea of a “Public Service Navigator” as a mechanism for influencing the conditions of access to content, particularly its visibility, discoverability, and usability. Yet, other scholars have been skeptical of the possibility to reform the public service system as such. The debate has thus mainly revolved on platforms’ regulation versus self-regulation [30]. Generally, it is thought that existing tools such as consumer data protection and antitrust regulation can be applied to these new challenges and that, more generally, media should be left to self-regulation. In the European media policy it is in fact assumed that in most cases soft law promotes self-regulation, even if doubts concerning its effectiveness and the transparency of certain tools remain. A paradigmatic example is in fact illustrated by EBU which is currently 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. Yet, more recently, media policy is moving towards a *cooperative responsibility*, that is, the result of the dynamic interaction between platforms, users and public institutions such as PSM [31].

4.1 Legitimizing a New Role of PSM

To legitimize any radical policy intervention as well as to guarantee an online media environment aligned with the most profound individual and societal needs, PSM should especially focus on the individual cognitive factors that challenge the experience of diversity online [32]. This means to employ a user-centric perspective and to especially focus on media literacy. To achieve this, we introduce three radical perspectives. Firstly, we argue the need to acknowledge the significance of power relations, that is, applying an agonistic approach to media pluralism. This could result in providing tools for contestation and for proactively seeking – but also be exposed to – challenging and minoritarian information. Relatedly, we advocate the need for an ‘architecture for serendipity’, that is, increase by design the access and exposure to alternative perspectives that intersects a user profile. Finally, we introduce an often underestimated element to improve users consumption: attention – the main commodity of the Internet [1] – which can be translated into ‘attention self-management’ to actually counteract the risks of addictive and superficial usage of social media and, more generally, the Internet itself, so as to foster a slow and more constructive consumption of media [33].

To begin with, media pluralism as a normative principle is vague and undertheorized, and it is not a reliable indicator of a society’s level of freedom and it can also create only the illusion of content diversity [34]. 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 potentially characterized by limitless choice. As such, Karpinnen [ibid] advocates the idea of ‘*agonistic pluralism*’ 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 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 weaken echo chambers, Bozdag and Van den Hoven [6] 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.

To achieve media diversity, there is also an increasing recognition that the design for serendipity in personalization has the potential to prevent the threats of filter bubbles and echo chambers [35]. In the last couple of years, emerging literature on how to research and cultivate serendipity in digital environments stimulated the academic debate. Serendipity is indeed 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. In general terms, its design implies diversification of information and interactive control. As such, it complements the value of diversity with paternalism and users' empowerment. From a theoretical perspective, instead, it recognizes the intrinsic limitations of personalization and profiling practices and, therefore, represents the attempts to overcome them.

Further, research on serendipity also investigates it as a capability of self-learning. The increasing role of accidental news consumption in the formation of individual and public opinion has been acknowledged, also called Incidental Exposure to Online News (IEON) [36, see also 37]. IEON is a promising behavior to encourage in the online environment as it may have a positive role in informing citizens and facilitating people's political participation. The majority of these studies are indeed based on the concept of *incidental learning*. Of course, there are 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 more 'serendipitous architectures' for social media.

Finally, to regain a relevant role in shaping users' information consumption and sustain knowledge acquisition, a special focus must be given to attention and its management. Attention management is indeed considered one of the most important skills for the 21st century, even replacing time management [38]. The ability to control distractions and stay focused is indeed essential to produce higher quality results in all aspects of life, particularly in hyperconnected societies [39]. Yet, the Internet is nowadays mostly based on the so-called 'attention economy' and related surveillance practices [1]. Mainstream platforms, in fact, conceive the attention of each user as a commodity that is then used to identify patterns of consumer behaviours, preferences, tendencies, etc. The attention of the users is, therefore, exploited, as it was – to a much more limited extent – in the pre-digital era. As such, users hold in a subordinate position. It is therefore imperative for PSM to counteract systems that are designed to capture users' attention and to provide tools that give them the autonomy to opt-out from certain design choices and better manage their own attention – also called attentive user interfaces. Psychological factors and media literacy are indeed paramount to overcome the challenges to experience diversity online and, more generally, for public discourse [32, 40].

5 Improving User Experience by ‘Meta-design’

In this paper, it is argued that a renovated PSM could provide affordances and tools for the Internet – and especially in social media – according to its traditional values, yet with updated goals. Drawing from insights on information architecture [41] and nudge theory [42], a review of current examples of browser extensions, aggregators and tool that empower users is done³. On the one hand, in fact, information architecture is a primary contributor to the shaping of the dialogue between the digital and the real and, thus, it is an ideal starting point to frame the concept of meta-design. On the other hand, nudge theory provide insights on its ethical framework. It is indeed possible to nudge users without introducing manipulative measures [43]. For example, Floridi [44] advocates for what he defines as ‘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.

As such, the concept of meta-design is preliminary framed as the re-design of a digital environment in order to change design choices as well as to inform and educate users; more broadly, as the act to reshape and enrich a website’s or platform’s information architecture and design throughout user-friendly tools such as aggregators and browser extensions so as to primarily influence and improve user experience as well as to sustain media literacy. In such endeavor, a user-centric perspective is implicitly applied to reflect on ways to extract value from users’ profiles meaningfully, to illustrate blind-spots, and to ultimately sustain the experience of diversity. Importantly, the paper also shows that most of these architectural modifications can be done without necessarily dealing with social media platforms. In fact, it is possible to help users to navigate the complexities of the new and fast-changing media landscape by exploiting the potential of ‘meta-design’. The following analysis provides insights on a potential multi-layered meta-design based on personalization and discovery tools on the one hand, and design choices and user interfaces on the other.

5.1 Personalization and Discovery Tools

A majority of PSM in Europe are currently moving in the direction of digital and algorithmic personalization [45], assuming the role of a public service navigator [13]. The encouragement of content discovery to disrupt filter bubbles has been already stressed by EBU [46]. Actual specifications for recommender systems (RSs) are, however, still to be developed. Due to fears of filter bubbles and echo chambers, the attention of EBU in the attempt to steer such development, for instance, was 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

³ This selection was not an easy task. Unfortunately, there is no specific tag to collect those that might have been interesting to analyze. There are already hundreds of browser extensions inherent education in browser stores. As a consequence, the choice was to take most of them from an article review role on online media consumption. Others, instead, were collected from personal experience and online search. As such, the selection is limited yet sufficient to show the main features of the tools.

broadcasting and interactivity/choice can reinforce each other [14]. Moreover, many institutions with similar histories and comparable media system frameworks are taking up different positions. Some consider the possibility to reach the value of universality through personalization, while other consider personalization to work against it. Also, some privilege implicit personalization over explicit one, with very different outcomes on PSM goals.

In practice, it could be possible to design personalization to balance conflicting values throughout information architectures that favor exposure, exploration and awareness. In this respect, the idea to create an architecture for serendipity has been advocated [35]. This would eventually translate into four major goals; on the one hand, to design RSs that (1) provide a certain amount of non-personalized content, (2) provide content that intersects users profiles, so that a user might discover new ideas and interests outside one's filter bubble, and (3) to provide content that is politically and ethically challenging in order to temper the effects of echo chambers. On the other hand, design for serendipity is more generally intended (4) to provide empowering tools to increase information findability and discoverability. Also Sunstein [3] stressed how an architecture of serendipity as such would sustain 'chance encounters and shared experiences', which are considered preconditions for a well-functioning democracy. For example, he proposed a 'serendipity button' during political elections in order to be exposed to cross-ideological content. Importantly, serendipity may work against the accuracy of recommendations and, therefore, it can threaten PSM's commercial needs.

An interesting example of an exploratory and serendipitous tool is provided by the MIT project Gobo, a social media news aggregator with sliders that users can control to filter information.⁴ This project sheds light not only on the possibility to provide sliders to filter media content based on certain democratic principles but, more interestingly, the possibility to aggregate and re-filter the information a user might want to consume in social media. Hence, it shows the possibility to bypass the algorithmic curation of information intermediaries. This, however, applies only to public posts. Yet, there may be implemented specific privacy settings to permit them to opt-in so that their posts may be included in the re-filtered feeds. Similar aggregators can be designed also for PSBs' websites and video sharing platforms like YouTube in order to increase information discoverability and the experience of diversity.

5.2 Design Choices, User Interface and Dashboards

A paradigmatic example of meta-design in social media is Social Fixer, an extension that improves user experience in Facebook and allows several design choices changes. Interestingly, it can set Facebook's NewsFeed to switch to "Recent Stories First" – the chronological feed, which is not algorithmically curated. By default, in fact, Facebook only shows you the top stories rather than every post made by your friends. Yet anytime one logs out of the website, the algorithmic curation reset by default the

⁴ Other similar news aggregators are *Newsbird*, *Allside*, *News 360*, *Digg* and *Flipboard* [see 18].

NewsFeed. Such simple design choice would permanently free users from the algorithmic influence of Facebook. Another example is the possibility to hide any metrics' posts in order not to get captured into so-called 'trendism', that is, be influenced by comparative quantifications (e.g. likes and shares). This could help users to self-control more effectively their attention. Yet, not only this project highlights the potential for re-shaping certain design choices but also the potential to communicate with messages and, thus, inform and educate users during their navigation.

Another significant mean to gain more influence over information consumption is by being aware of the production and consumption of information (*what* and *why* information is filtered and *how* one consumes it) [see 17]. For example, it is possible to encourage blind-spots explorations. In this respect, a notable example is the visualization tool developed by Nagulendra and Vassileva [47] 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 of a certain category to the filters. To our knowledge, this is the only attempt to show filter bubbles to users. Yet the quality of the design can certainly be improved and its scope expanded. While data collection may prove to be limited, users may opt-in to provide their personal data.

Further, extensions like Data Selfie provide insights on what algorithms think about you, your inferred personality and your vulnerabilities. This might be helpful given that persuasive technologies have different outcomes on diverse personality types, and the awareness of one's own vulnerabilities could truly help users in their self-management. Even simple design choices can be extremely effective. For instance, Social Fixer affords the option to disable the auto-loading of posts (similarly to the auto-play function for videos which is usually set by default). Hence, one can decide to scroll n posts anytime one logs in, without being persuaded in an endless stream of content. Equally important, notifications management could be useful too to avoid distraction. Eventually, so-called information nutrition labels [48] can also help to manage your attention as well as increase awareness. For example, they can show the time reading, style and reliability of any article by text analysis.

6 Discussion

The above browser extensions, visualization tools and aggregators provide insights on the potential role of PSM in improving users' experience according to its values. It is by no means a ready-made framework any PSM could operationalize. Yet it highlights how certain extensions and tools are bringing innovations that PSM might replicate and eventually ameliorate. Despite technical challenges, meta-design can actually help PSM to collect data about users to better understand them, then inform, educate and nudge them towards its values. If such potential is employed, it might help to set the standards on a more mature information consumption, afford novel conditions to participate and benefit from social media usage and, eventually, contribute to solve the

main challenges to experience diversity online [see 32]. At the same time, it would sustain the four modalities of expressing voice⁵ [see 18]. Ultimately, it aims to preserve not only media pluralism and users' experience of diversity but, above all, their awareness and autonomy of choice. In addition, it has the potential to help to overcome some of the major identified causes of the crisis of PBSs (such as outdated values, harsh competition and government control, see [11]).

One may thus wonder why such tools have not been institutionally employed so far. To the knowledge of the author, in fact, there are in fact no noteworthy experiences of public efforts towards the creation of similar news aggregators, nudging by design or visualization tools. One explanation may be the widespread assumption that users are fully autonomous players able to manage the complexities of online information consumption. And although user-centred solutions may better foster the transparency of RSs, for example, they have significant shortcomings: they shift the responsibility and accountability for the protection of rights and utility to the users, and this may result in inefficiency such as insufficient privacy protection [49]. This is also partially true for media consumption.

Further, there is mainly a lack of scientific evidence, both about the risks of Internet usage and the effectiveness of these tools. Also, political challenges may be paramount. Citizens may not want to use these tools, while platforms proved to be difficult stakeholders to engage with whenever their revenues are threatened. It is evident the potential opposition of the platforms in which these tools may be experimented, so that they may be easily sabotaged. Somewhat paradoxically, another significant element is likely to be that such public intervention would more likely account for an irrelevant share of investments given to PBS and PSM. Clearly, these tools are extremely cheap compared to the content produced by PSB. Thus, economic incentives in this respect appear to be very weak for an institution that is especially struggling with funding. However, considering the rising awareness in the public opinion of the risks of social media and the educative potential of browser extensions, there is room to expect their employment in the near future.

Despite obvious political challenges, there are certainly several other limitations concerning the outlined preliminary framework. First of all, as said, its effectiveness, in particular concerning personalization and the attempt to provide users with exposure to challenging information. Interactivity might indeed threaten the principles of publicness and universality and not fulfil the goal of maintaining a common sense and belonging. The political consequences of exposure to dissimilar views, then, have long been a subject of polarization research, but findings are largely mixed. For example, polarized individuals may polarize further while exposed to challenging information (so-called *backfire effect*). Another related-risk is that users do not exploit such tools – they do not always want to be in control (e.g. the *paradox of control*). As a consequence, inequality may be even strengthened. These issues certainly require more understanding of users' information behaviors as media landscape changes rapidly and steadily. It is not possible to make harsh generalizations: the heterogeneity and nuances

⁵ Building on the work of sociologist Hirshman, Harambam et al. [18] intend 'voice' as "the possibility to exert control over the data-driven processes that shape news provision".

of users must be better comprehended. These challenges actually represent additional reasons to begin experimenting with meta-design in order to understand and eventually exploit its opportunities.

7 Conclusions

Public Service Media (PSM) is striving to adapt to the digital revolution. There are still many opportunities to explore and challenges to face. As such, in Sect. 2 the article provided an updated and extensive review of research on the risks of social media usage. By doing this, a precautionary approach has been advocated, in particular due to the heterogeneity of the audience, intrinsic research limitations, the oligopolistic social media landscape, and the rise of increasingly sophisticated and subtle techniques of behavioral modification. In Sect. 3, a critical analysis of the role and the evolution of PSM was done. A renovated role of PSM is advocated, especially regarding asymmetrical power relations between platforms and users, the opportunities to improve user experience and the rising of PSMs' recommender systems.

In Sect. 4, it is argued that traditional PSMs' values such as universality, publicness, interactivity and diversity can be mediated and reinforced by an architecture for serendipity and an agonistic approach to design, that is, empowering users to sustain their motivations, raise their awareness and increase their skills to experience diversity. To achieve this, a core focus of media pluralism should be media literacy, through interactive education and, particularly, attention management. Further, in order to understand how to actually increase the experience of diversity as well as to sustain media pluralism and, more generally, the traditional values of PSM, a brief review of paradigmatic browser extensions and aggregators was also done in Sect. 5. It is argued, in fact, that these tools represent an undervalued, if not neglected, mean to experiment with digital environments, especially to better understand emerging audiences. No experience of institutionally-mediated browser extensions has been detected so far. Thus, an analysis on significant private and academic experiences was conducted and, eventually, the concept of meta-design was initially framed. In short, this is intended as the act to by-pass the design of websites and extract value from users' information consumption – primarily by browser extensions – so as to raise awareness and agency of worldwide users without having to legally deal with platforms themselves.

The outlined preliminary framework certainly needs empirical research. Despite outlined challenges, there is room to design architectures and tools able to nudge users according to PSM values. The role of meta-design might radically inform, educate, empower and nudge users. Of course, operationalizing such an endeavor is not a trivial task. In this paper, only an initial attempt to advocate for such a proactive role of PSM has been made. Although faced with many technical, social and political limitations, the presented concept of meta-design can represent a novel mean of soft and/or co-regulation and audiences' analysis for PSM institutions, particularly in Europe where the regulation tradition of media pluralism and PSB could favor the legitimization of such innovations.

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