BIG DATA AND TELEVISION BROADCASTING. A CRITICAL REFLECTION ON BIG DATA'S SURGE TO BECOME A NEW TECHNO-ECONOMIC PARADIGM AND ITS IMPACTS ON THE CONCEPT OF THE «ADDRESSABLE AUDIENCE»

Big Data y televisión. Una reflexión crítica sobre el auge del Big Data como nuevo paradigma tecno-económico, y su impacto en el concepto de target de audiencia

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ABSTRACT

The paper explores how big data creates challenges and opportunities to enhance value relationships between TV broadcasters, audiences and advertisers in digital television broadcasting. It finds that research into big data requires much closer attention to critical issues in the social and cultural sciences – with a focus on media and communication studies and its subfield media management – to inspire our understanding that big data would perfectly fit the dominant «techno-economic paradigm», a meta-narrative for a substantial technological revolution that has the power to bring about a transformation across the board in ways that when new technologies diffuse, they multiply their impact across the economy and eventually modifies the socio-institutional structures. While asking how big data adds value to a broadcaster's decision on corporate strategies in Big-Data driven TV is legitimate and important, we remain skeptical as to what effectively is to be gleaned from big data in broadcast TV This is because the socio-cultural dimensions are greatly unresolved. Notably, the corporate strategies of the «addressable audience» or audience commodification, whereby audiences are effectively sold as mere datacommodities to broadcasters and advertisers, must be observed critically.

Key words: Audience commodification; Audience measurement; Big data strategy; Connected TV; Television broadcasting.

RESUMEN

Este artículo explora el estado de la cuestión sobre los desafíos y oportunidades del Big Data para incrementar el valor de las relaciones entre los operadores de televisión, las audiencias y los anunciantes que permiten los servicios di-

gitalizados de televisión. Se plantea que la investigación sobre Big Data requiere prestar mayor atención a cuestiones críticas en las ciencias sociales y en la cultura –relacionadas con la comunicación y la gestión de medios– para ayudarnos a comprender que el Big Data puede, perfectamente, encajar en el paradigma tecno-económico dominante; una meta-narrativa sobre una revolución tecno-lógica sustancial que tiene el poder de transformar todos los ámbitos: cuando se difunde, multiplica su impacto en la economía y, finalmente, modifica las estructuras sociales e institucionales. Aunque es legítimo e importante preguntarse cómo el Big Data proporciona valor a las decisiones estratégicas de los operadores de televisión, conviene mantener el escepticismo sobre lo que se puede obtener del Big Data para los servicios de televisión mientras las cuestiones socio-culturales no se resuelvan. Hay que analizar con sentido crítico las estrategias de mercantilización de la audiencia o de target de audiencia, mediante las que sus datos se venden como una simple mercancía a los operadores y anunciantes.

Palabras clave: Mercantilización de la audiencia; Medición de audiencia; Estrategia de Big Data; Televisión conectada; Televisión.

1. INTRODUCTION: BIG DATA'S SURGE TO BECOME A NEW TECHNO-ECONOMIC PARADIGM

Television is reaching yet another tipping point in its industry evolution. Driven by new developments in digital technology, device proliferation, changing distribution methods, and the increasing popularity of social media, transformations provoked by the convergence between television broadcast and internet broadband, allows for the boundaries between television broadcasting and the internet to disappear. The means for accessing online videos continue to diversify. Adding to the ranks of PCs and smart-phones are diverse new devices such as tablets, game consoles, and internet-capable Connected TVs, leading to increases in both user levels and the variety of services on offer.

The media industry is not only challenged by this technological change, but also by the business acumen of the tech-sector to develop media formats and reach audiences outside of the established media industry channels. Connected TV has become associated not only with latest technology, new content wealth, and audience gratifications, but also with underlying industrial strategies of broadcasters collecting heaps of data with powerful and sophisticated Big Data Analytics (BDA) tools about their users and audiences by capturing their second-by-second behaviors, not always to their avail. Their aim is gaining competitive advantage in the ever more competitive environment of Connected TV. However, powerful platforms such as Amazon Prime, Netflix or YouTube are rendering their services consequentially data-driven, exploring unprecedented forms of reaching audiences and develop media production.

Since then, Connected TV has become associated not only with latest technology, new content wealth, and audience gratifications, but also with underlying industrial strategies of broadcasters collecting heaps of data with powerful and sophisticated big data analytics tools about their users and audiences by capturing their second-by-second behaviors, certainly not always to their avail. Their aim is gaining competitive advantage in the ever more competitive environment.

At the heart of this dilemma – and this is our main issue in this article – lies the question of what is to be gleaned from big data repositories that are currently established and curated by these broadcasters. The stakes are high: Big data services promise to reveal audiences, not only in what they are watching and listening to but through large data sets predicting what they want before they even know what they want.

For newspapers, television, magazines and Internet-only publishers, Big Data strategies can include audience analytics tools:

- to enable a better understanding and targeting of customers
- to understand public and private databases for journalistic storytelling
- to manage the exploding amount of video, social media and other content

- to target advertising and ad campaigns
- to automate the production of text and video stories
- to identify new broadcasts

As such, broadcast TV is today increasingly associated not only with latest technology tools, new content wealth, and audience gratifications, but also with underlying industrial strategies of broadcasters collecting heaps of data with powerful and sophisticated big data analytics tools about their users and audiences. As powerful platforms such as Amazon Prime, Netflix or YouTube are rendering their services consequentially data-driven, exploring unprecedented forms of reaching audiences and develop new TV media productions, «legacy» broadcasters – as the EBU Big Data Conference 2018 in Geneva has posited – are forced to follow suit in:

- creating an appetite for data-driven strategies across organisations
- rethinking the organisational chart to mobilise the potential of data
- helping staff buy into big data strategies
- using new measurement metrics to support programming and production
- helping newsrooms embrace the potential of data journalism
- offering users fully personalised services
- catering for the specific needs of younger audiences

Critically, as the social is extensively mined, its data are used to predict human behaviour and automate decision-making processes. As José van Dijck claims, «datafication as a legitimate means to access, understand and monitor people's behaviour is becoming a leading principle, not just amongst techno-adepts, but also amongst scholars who see datafication as a revolutionary research opportunity to investigate human conduct» (2014, p. 198).

This study argues that research into big data requires much closer attention to critical studies in the social and cultural sciences. We suggest that while asking how big data adds value to a broadcaster's decision on corporate strategies in big data driven TV is legitimate, we need to remain skeptical as to what effectively is to be gleaned from big data in broadcast TV when the socio-cultural dimensions are unresolved and the strategies of the «addressable» audience sold as mere data commodities to broadcasters and advertisers are critical.

This study thus explores the role of big data practices and its potentials for better understanding the impacts of big data on the challenges, opportunities, corporate-level and larger socio-economic and cultural implications associated with the use of big data in the Connected TV era. More specifically, the authors seek to answer the following two principal research questions:

RQ1: What are the different types of key challenges theorized/proposed/confronted by big data applications and services implemented by TV broadcast media organizations?

RQ2: What are the specific implications for audiences as they are increasingly commodified for corporate strategies by means of addressable audiences as a key to marketing strategies of digital personalization?

2. BIG DATA AND TELEVISION BROADCASTING: THE KEY CHALLENGES

One might expect a rich literature and ample empirical insights into the important issue of big data as it increasingly becomes a trending practice that many broadcasters are adopting with the purpose of constructing valuable information from big data (e.g. Arsenault, 2017; Boyd & Crawford, 2012; Lippel, 2016; Manovich, 2012).

Although there is an ever-growing discourse about big data in the TV broadcast industry, our own review of this burgeoning literature concludes that a clear picture of the big data challenges and opportunities in building data-driven organization, impacting on TV programming, commissioning, distribution, scheduling, and user data exploitation across devices etc. is far from having fully emerged.

What are the key challenges? First, it is assumed that big data creates opportunities to enhance value relationships between broadcasters, audiences and advertisers (Couldry & Turow, 2014; Jennes, Piersen, & Van den Broek, 2014; Kosterich & Napoli, 2016). It shall help understand both opportunities and threats of its use regarding traditional «legacy» broadcasters trying to add value to its programming portfolio and audience/advertiser relationships in order to achieve and retain competitive advantage.

On the supply side, TV companies may now collect these vast amounts of data about audiences and users thanks to subscription and registration services, but, however, are still largely failing to put this information to practical use, a white paper of market research firm GfK claimed in 2015. In Big Questions, Big Answers: Will harnessing smart data for audience analytics save the broadcast industry? (2015), GfK (Gesellschaft für Konsumforschung), Germany's largest market research institute, explored the benefits of big data for broadcast and outlined the future it has for the TV industry, based on interviews with key decision makers and executives from 14 media groups from around the world.

The study highlighted three broad findings, the first of which was the changing nature of the data now required. TV operators are moving away from asset-based data – such as the number of subscribers or the number of plays in a given time period – towards behavioral data collected from panels or in real-time from viewers who consume video content across formats, platforms, and screens. Behavioural data was also identified as being key to unlocking new insights by placing viewer habits in context. The third thing stressed by GfK was that all the data collected could only become valuable «through intelligent transformation and interpretation» in order to enable a better understanding of the audience and emerging trends.

Hence, evidently, the GfK study is indicative as it points to a critical issue of traditional TV broadcasting: Will it be able to harness smart data for audience analytics and will this «save» the broadcast industry for it to become more audience-oriented and hence more competitive and innovative? Or does linear TV run the risk to «being Netflixed», that is increasingly outperformed by the new online streaming portals, as the Guardian wryly noticed.

Certainly, one key component for big data in the TV context is the digital trail left by viewers as they flick from channel to channel. This information is invaluable for both broadcasters and advertisers: it reveals the audience's likes and dislikes and allows broadcasters to target their content more accurately. Studies on how broadcasting organizations create value from their ever-increasing datasets combined with powerful and sophisticated analytics tools and the challenges they face in doing so show how they minutely capture audiences' viewing habits which allows them to target advertising and to recommend appropriate content (Napoli, 2011; Vidgen, 2014).

Still, the strengths of digital technologies, be it social, mobile, big data analytics, or cloud computing – does not lie within these technologies individually. Instead, it consists of how broadcasters integrate them to transform their organizational processes, cultures and business models. However, broadcasters which still mainly operate as value chain companies, following the «pipeline model» may miss out on the opportunities that big data do offer. Naturally, while their content is still the driver of data, creating, capturing, and maintaining value from interacting with audiences and advertisers will be a central tenet of competitive advantage for legacy broadcasters in the future. And this means that

they understand that the big data value chain details the complete big data lifecycle, ranging from data acquisition, analysis, curation, and storage to data usage and exploitation.

Now, as big data increases the value of audience data even more, broadcasters – being media owner, publisher, broadcaster and platform provider at the same time – may create business value through a wide variety of data, including navigations clicks, video views, content metadata, account information, sales transactions, social-media data, location data, weather data, and more (Stone 2014). This data will become as important as great content, and bringing those two worlds together without the audience having to care about it will be key for their survival.

Secondly, technology-driven convergence processes facilitate business model innovation, which means that traditional broadcasters now need to reconfigure and reinvent how to create value in the Connected TV domain. Industry insiders, supported by a fleet of affirmative experts, have been quick to grasp that commercial mass media would be struggling to find new revenue streams and thus proposed different strategy perspectives for the converged-media future (Downes & Nunes, 2014). Traditional broadcasting, the argument goes, would only survive of it continued to experiment with content innovation and new programming (Dogruel, 2013; Gandhi, Martinez-Smith, & Kuhlman 2015), advanced into «programmatic TV» as a technology-automated and data-driven method of buying and delivering ads against TV content (wywy, 2016), thus delivering the right content to engaged audiences-as-buyers, invented new strategies for distribution (such as, for example, the «platform» model to replace TV channels with portals; Baumann & Hasenpusch, 2016), increased audience engagement including the audience's willingness to share personal data (Evens & Van Damme, 2016), monetized activities and the search for new business models (such as Paid-Owned-Earned, POE[1]); Murschetz, 2016), and employed big data analytics with a view to increasing performance (Bughin, 2016; Chen, Chiang, & Storey, 2012).

Indeed, until now, the TV business has been a linear process, where journalists would gather observations and turn them into news and entertainment, which are then committed to be broadcast, and finally consumed by the audience. This «pipeline model» is the simplest metaphor for that process, when content distribution was organized around the broadcast tower (Choudary, 2013). But if we believe that the nature of new digital TV business models which emphasize that organizations must interact with their audiences out of their very nature and legitimacy (Amit & Zott, 2012), then business models that used to support traditional media companies in the past appear not to work in the digital age anymore. Addressing this business model innovation gap raises the fundamental question of how commercial broadcast media will manage to survive as traditional sources of revenue (paid display ads, subscriptions and transaction sales) shrink.

3. THE CONCEPT OF THE «ADDRESSABLE AUDIENCE»

As audiences move between platforms and increasingly participate in complex patterns of consumption, most media organizations are, in the simplest terms, in the business of connecting media texts with audiences, to earn money through direct purchase or pairing audiences with advertisers. How people engage with media such as television drama, twitter feeds, or reality entertainment is a big

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[1] Solving this issue is vital as the legacy revenue model through «paid» (i.e. all forms of advertising for which a media purchase is necessary) and «owned» (i.e. all content assets a brand either owns or wholly controls) media is failing. Paid advertising has found many outlets, atomized into thousands of blogs, Facebook pages, and specialized television and radio stations, so that return on investment is becoming difficult to trace due to audience fragmentation. Social media enhancements are the best drivers of opportunity to complement paid and owned media revenue models. The latter are so-called «earned» media revenue-generation activities and are gained through user-generated content created and/or shared by users. Still, earned media are the most elusive of the three marketing channels (Altimeter, 2013).

issue in media and communication studies as they try to understand the audiences new «media repertoires» across devices (Hasebrink & Domeyer, 2012; Hermida, Fletcher, Korell, Logan, 2012).

Media engagement research hence tries to gain insight into industrial contexts for engagement, including performance metrics, production practices and policy discourses, as well as people's shifting and subjective relations with media as live audiences, catch up viewers, illegal users, citizens and consumers, fans and anti-fans, contestants and participants (Lomborg & Mortensen, 2017). This implies that traditional methods of audience measurement no longer reflect today's TV reality (Green, 2016; Kelley, 2017; Kim, 2018; Nelson & Webster, 2016). Changes in how audiences actively use and engage in television, and the ways in which these behaviors are measured facilitate the transformation of dealing with an «active audience». Audiences today have become more globalized, more commodified, more connected (and, thus, potentially more participatory yet simultaneously more surveilled) (Livingstone, 2015).

However today, big data is often used to more or less loosely describe techniques, that are understood to «commodify» TV audiences in the digital TV audience marketplace, i.e. to target them more effectively with personalized content in order to optimize advertising revenue. Still, applying the right audience metrics as the new «currencies», and tracing audience engagement patterns could be used to better understand sense making processes and emerging protocols (Napoli 2016b, and 2011). Data helps to give insight into implicit consumer behaviors, creating predictors for consumer behavior that help companies the chance for proactively responding to changes in market environments (Day 2011). Data must be linked through individual user IDs to create comprehensive pictures of behavior as determined from various sources (i.e., TV viewership, social media, and purchase data). Once this is possible, companies can build better behavioral models for households and individuals.

For instance, Netflix uses big data to create (and advertise) its TV shows by analyzing and predicting preferences of subscribers (Erevelles, Fukawa, & Swayne, 2016; Bughin, 2016). In an interview with Fortune, Michael Smith, professor at Carnegie Mellon University's Heinz College of Public Policy and Management, discussed Netflix's use of big data as follows:

> The making of House of Cards illustrates how a bunch of different changes coming together at the same time can be really disruptive to the traditional industry. The thing that Netflix had that nobody else in the industry had was they didn't just know that there were a bunch of [fans of the House of Cards lead actor, Kevin Spacey] in the abstract, they knew exactly who those Kevin Spacey fans were, and they could use the platform to target them directly. So, Netflix went out and created nine separate trailers for House of Cards and targeted them directly to those users. So, I think part of the story is the power of detailed customer data to help you do a better job of marketing the content (Fortune, 2016; see also Smith & Telung, 2017).

Seen critically, however, there is also the risk that big data is merely used as a sort of business model for «audience commodification» (Kosterich & Napoli, 2016). This means that big data may be used as a tool to reconfiguring the audience as a mere commodity, or, in the words of proponents of the political economy of the media, audiences would merely perform «audience labour», whereby they act by «paying attention» and «learning to buy», and would thus «perform as the ultimate marketing service for [advertisers]» (Smythe, 1977, p. 6; see also Fuchs, 2012). Conversely, however, one is also tempted to ask for the benefits audiences may retrieve from these new forms of interaction with

broadcasters and their tools. Would audiences not appreciate the use of big data technologies as they contributed to meeting their demands? Does information deriving from big data use not also to enrich audience engagement and user experience for the better of themselves?

In fact, some researchers argue that commodification can be used as a tool for value generation of organizations (e.g., DiZerega, 2004; Fleissner, 2006). They argue that new technologies increase the power of media giants and businesses to commodify audiences and to sell them to advertisers. Some researchers such as Jennes (2014) oppose the negative sense of audience commodification by introducing «audience empowerment» and argue that digital technology can also enable users in dealing with the surrounding environment.

Cultural studies, on their side, have long been arguing that audiences make active use of the technologies offered to them to create individual value and meaning. Broadcasters can see how many minutes of a show a viewer watches, whether they watch a single episode in one sitting, or whether they run through three or four (or more) episodes per night. Netflix, for instance, uses data like this to evaluate their policy to publish whole seasons instead of weekly episodes (Carr, 2013; Havens, 2014; Kastrenakes, 2015; Madrigal, 2014). If we follow Askwith (2007, p. 49) and understand viewer engagement as an overall measure to describe both the depth and the nature of an individual's specific investments in a given object, then engaged viewers are more prosumers or users than consumers. They create (additional) meaning by engaging with television content in several ways like, for instance, using «paratexts» (i.e., professional or user-generated ancillary content that adds to the sense making process) and interacting in social media (thereby creating even more data traces). These activities enhance involvement in the text, identification with its characters, participation in follow-up communication, and motivation to seek out similar content (Schlütz, 2016). Integrating big data with such contextual information will provide a depth of knowledge that complements current measurements such as ratings (e.g., as with GfK in Germany, Nielsen in the U.S., or BARB in the U.K.). While those ratings project whole numbers based on a sample, new ways to track engagement and tie data to users on a more granular level will give both broadcasters and advertisers greater insight. And, as indicated above, it could well be used to better understand audience engagement and its implications for the creation of meaning. None of the traditional dimensions – who, what, where, when, how – are stable or inherently predictable. Big data analysis, derived from Connected TV viewing behavior and affiliated social media technology and use, by contrast, combines viewer metadata, device-level data (views, completion of episodes, and whole seasons), distribution-level data (TV, mobile, computer, game consoles, etc.), web traffic data (volume, click-troughs, page views), geo-location (postal code), or data from third-party sources (e.g., TV ratings and credit card data). These data let broadcasters develop much deeper and more personalized relationships with their audiences, which until now have been unimaginable. They are now able to

- understand how, where and when people are enjoying programming content and services,
- reveal exactly who is accessing which content at what time and where,
- open new channels for personal interaction and dialogue,
- extend influence far beyond existing geographies and target audiences (e.g., to acquire new audiences such as millennials), and
- aggregate individual data for insight and intelligence across platforms (i.e., as input for further programming decisions, new distribution decisions, optimizing programming plans, ad targeting, and real-time marketing).

Again, a fundamental limitation of big data is the lack of contextual data, for instance regarding attitudinal information. big data tells you who is watching, but not why, and with what effect. Classic

market research – such as panel measurement – alongside return path data (RPD), and social media data will thus retain importance accompanied by qualitative data that aim at understanding individual readings and the sense making process of audience engagement.

So, again, what does big data do for the audience in order to be attractive? If we assume that TV viewers derive value from media from TV through «meta-communication», i.e. «communication about communication» or «all exchanged cues and propositions about (a) codification and (b) relationship between the communicators» (Bateson, 1951, p. 209), that «television is not only what producers assemble, nor only the particular text on the screen, nor only what viewers make of it, but consists of all of this: all the institutions and practices that surround, produce, and contextualize those moments, i.e., all that makes the very idea of 'television' meaningful» (Kompare, 2011, p. 97). Social media have become an important platform for engaging consumers in this meta-communication. But once again, it is evident that this only works when a large amount of user data can be generated and for this a critical number of engaged users must exist (Erevelles, Fukawa, & Swayne, 2016; Napoli, 2016, and 2014).

Large data-driven companies, such as Facebook, Twitter, and Google, show how data stimulate the monetization of the digital space: Their platforms track and sell consumer data, thereby increasing the value of the companies with every like, share, search, or post while at the same time violating users' rights by ignoring privacy issues.

However, from a consumer's point of view, this could still be beneficial because media organizations could require readers to share personal data instead of charging them for the product. In today's big data era, online platforms, such as Facebook and Google, utilize consumers' personal data to optimize personalized offerings in return for free services. The so-called «data-wall» (an analogy with pay-walls) model secures access to a selection of (free) personalized media content. The data-wall business model requires that viewers share personal data with news organizations in order to obtain free access to a particular selection of digital content. However, the data-wall's success ultimately rests on consumers' willingness to share personal information, and hence, pay with personal data. Issues of data protection and privacy, however, may undermine consumer acceptance of data-walls and hinder the implementation of these part of big data strategies (Evens & Van Damme, 2016).

4. CONCLUSION: MANY QUESTIONS UNRESOLVED

This paper has sought to interrogate the role of big data as a key driver of change in the new television broadcasting ecosystem, and of the social practices and cultural protocols (and their resistance to embracing these, respectively) that emerge in its shadows.

Theoretically, it conceptualized some fundamental relationships between the concepts of big data, and the economics of television broadcasting in the public interest, primarily regarding the role big data plays in strategizing about the right level of audience engagement as main driver of value enhancement and profitability for broadcasters.

Given the findings of our discussion, we can reasonably conclude the following: Firstly, considering the relevance of broadcasting as democratic mass medium, and the current influx of perhaps the biggest wave of data about user viewing habits, ratings, and preferences, media economics and TV studies still play a relatively modest role in explaining the impacts of big data in TV broadcasting[2].

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[2] Sill, Publications like Big Data Quarterly, Data Informed, Big Data Innovation Magazine and market research firms such as McKinsey, Forrester, and Gartner, proselytize big data as 'The Next Frontier for Innovation, Competition, and Productivity' (Manyika, Chui, Brown, Bughin, Dobbs, Roxburgh, & Byers 2011).

As described by Kneale, Martinez-Smith, and Kuhlman (2015), «the resulting ecosystem of big data technology is made possible by the evolution of TV application architectures from dedicated hardware-centric functionality to a combination of hardware appliances and modular software services. As a result, big data technologies can support rich, interactive TV experiences by collecting, storing, and analysing federated events and by creating usable information for end-consumers, operators, and programmers» (Gandhi, Martinez-Smith, & Kuhlman, 2015, p. 1). In sum, these technical tools let broadcasters not only capture existing structural and behavioural data, but also predict models for viewing behaviour, monitor cross-media viewing habits, and cross-analyse viewing with purchase behaviour and social media trends. «It also shows them how to schedule programs to lower costs, rev up ratings, and build audience flow; single out the most impressionable viewers and engage them to watch more; target promotional spots to convert more viewers while consuming less airtime; and direct the right ads to the consumers most likely to respond», Dennis Kneale, analyst of Broadcasting & Cable (2016) reported.

Still, we believe that research into big data requires much closer attention to critical issues in economics and the social and cultural sciences in an attempt to intrigue our understanding that big data would perfectly fit the dominant «techno-economic paradigm», a meta-narrative for a substantial technological revolution that has the power to bring about a wide-ranging transformation across the board: «It is the techno-economic paradigm (TEP), evolving as the new technologies diffuse, that multiplies their impact across the economy and eventually also modifies the socio-institutional structures» (Perez, 2010, pp. 13-14).

While asking how big data adds value to a broadcaster's decision on corporate strategies in Connected TV is legitimate and important, we remain skeptical, however, as to what effectively is to be gleaned from big data in broadcast TV when the technological challenges are not met, the socio-institutional dimensions remain unresolved, and the corporate strategies of audiences sold as mere data commodities to advertisers are critical (Kosterich & Napoli, 2016). We can thus support Shawndra Hill's view:

> The holy grail, of course, is that TV broadcasters and advertisers want to know their audiences better in order to sell products. We are seeing new devices that might make this option a reality in real time soon. Apple TV, Roku, and Google's Chromecast all offer Internet streaming options where connections to purchasing behavior can be made. Recently, Amazon entered the market with Amazon Fire TV, which will enable the company to sell their consumers more of nearly everything on Amazon during viewing. In addition to real-time predictions, broadcasters and advertisers want to predict future viewing and purchasing habits in order to plan production and advertising better (2014, p. 84).

Hence, we suggest understanding big data as a paradigm and something certainly more than a mere buzz-word to describe technology and the associated software solutions used by broadcasters to dream up viable new business models. Rather, it is a social practice: Broadcasters need to be aware that audiences employ technology to actively influence if not shape television broadcasting (behavior) in their own favor. As a corollary, big data is not an objective, external property of technology with deterministic impact on adoption, usage and performance within broadcast media firms, but both a system- and human-related artifact of computer-mediated communicative interaction in the digital media domain (Mackenzie & Wajcman, 1985).

However, while theorizing on «digital traces» itself is subtle and sophisticated, skepticism as to its value for analyzing changes in television broadcasting economics within the digital marketplace prevails. Hence, we believe that the techno-economic paradigm remains problematic or is, at best, speculative, and analyses based on it are not able to give valid inferences on economic welfare and social well-being. It is the social dimension that needs to be addressed much more thoroughly shall big data deliver on its promise. Wagner-Pacifici, Mohr and Breiger (2015, p. 1) have further clarified what this means: The social and cultural sciences need to reflect on «the locus and nature of human life, the nature of interpretation, the categorical constructions of individual entities and agents, the nature and relevance of contexts and temporalities, and the determinations of causality». Ultimately, research into «datafying» broadcasting needs to confront these issues because, as it appears, big data now seem to change broadcasting in ways that may be more beneficial to the industry than to the audiences.

Secondly, while asking how big data adds value to a broadcaster's decision on corporate strategies in Connected TV is important, we remain skeptical, however, as to what effectively is to be gleaned from big data in broadcast TV when the socio-cultural dimensions are unresolved, and the corporate strategies of the addressable audience or audience commodification, whereby audiences are effectively sold as mere data commodities to broadcasters and advertisers must be observed critically. While «datafication» is principally identified as a core dimension of the current transformation of the broadcasting industry, we still have scant insight into the conditions in which it is likely to be economically, politically and culturally consequential for broadcast media and more importantly – how, if at all, this transformation might be socially valuable for media audiences and society at large (Manovich, 2012; Schäfer & van Es, 2017; van Dijk et al, 2018). Instead of musing about a possible return on investment for the media industry, we need to query both the economic value of datafication and its return on audiences and society. These dimensions needed to be addressed much more critically shall big data deliver on its promise.

When looking into identifying digital strategies in new TV broadcasting ecosystems such as Connected TV, much deeper insight into the role of big data and viewer «datafication» as well as audience engagement in changing broadcasting is necessary. Obviously, there is still a lack of critical analysis in media economics and management research that would go beyond euphoric industry rhetoric and challenge notions of viewers as commodities, with some notable exceptions (e.g. Napoli 2016a). Analyses into direct, unmediated market relations between broadcasters and audiences are a first step in this direction. For now, much of the rhetoric of big data contains no meaningful analysis of its potential perils, only the promise of the glass consumer. Recognizing this key paradox of big data, i.e., showing its perils alongside its potential will help us to better grasp the concept and the theoretical and empirical consequences. big data tools let broadcasters not only capture existing structural and behavioral data, but also predict models for viewing behavior, monitor cross-media viewing habits, and cross-analyze viewing with purchase behavior and social media trends.

And finally, further research into big data and its role for changing broadcast television needs to recognize this fundamental ingredient: that television should primarily serve the audiences who are supposed to actively shaping their own media future. For public service broadcasters, this comes as a heavy burden. As Karin van Es (2017) rightly pointed out: To align their public remits with Big Data, PSBs need to engage in what Couldry et al. (2016) have termed 'real social analytics'. Real social analytics considers how the digital infrastructure (i.e., algorithms, analytics, architectures and platforms) of social actors supports their social aims. It takes as it point of departure the fact that social actors such as PSBs have a digital presence that is measured and counted (analytics commonly used to establish commercial value). The approach concerns itself with how these social actors make their digital pres-

ence 'an effective object of reflection and action' (Couldry et al., 2016: 127). Put differently, analytics make these social actors known to others and allow these social actors to reflect and act on that presence. At the crux of this approach, I propose, lies the idea of having a relevant and reliable model of reality. This relates directly to how values are translated into proxies and how data-mining practices are made genuinely accountable.

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