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### News devices

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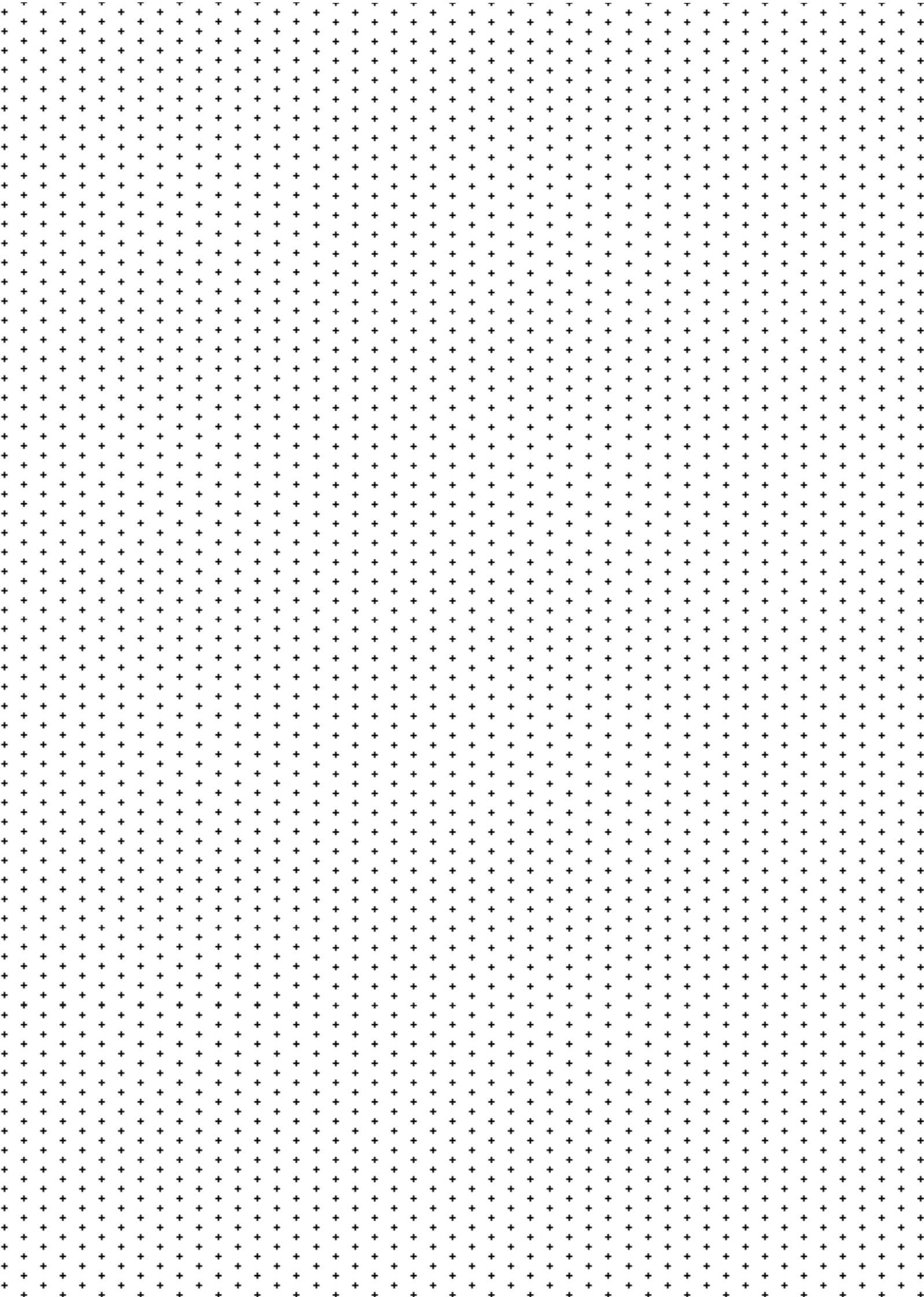
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## 6. Conclusion

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In this thesis I set out to empirically explore the interactions between digital devices, news work and journalism research. I started this project imagining that promising new digital methods and device approaches could help make a contribution towards understanding digital transformations of news and associated forms of work.

For this reason, I set out to test and further elaborate what might be entailed in bringing such approaches to bear on the study of news through a series of empirical cases. Such techniques come with challenges and are sometimes met with ambivalence. They can either be suspected to be prone to misrepresenting the studied phenomena due to various digital biases, or they can be embraced as sources of data about social phenomena, without paying attention to how they interfere with them, and treated alongside big data approaches. While both these positions represent traps that digital research can fall into, the research techniques I explore in this dissertation offer means to avoid these problems. But to do so they call on us to slow down, to stay with the troubles we come across (to use Haraway's (2016) language), and let digital devices interfere with the topics we study, the methods we develop and the research problems we address.

My main argument in this dissertation is that the study of digital news and journalism could benefit from approaches that treat news work as co-produced through interactions with digital devices, and that to account for these interactions we can leverage the affordances of digital devices for research. I proposed the notion of news device to capture this twin proposal to attend to the role of digital devices in news work and in digital journalism research.

I argued that how digital objects participate in news work and in journalism research is an important question. Digital devices are habitually used to make and consume news and they are becoming an increasingly salient part of infrastructures that sustain our information spheres. While these devices are increasingly being recognised as a significant participant in news work, news is not necessarily widely recognised yet as a hybrid, socio-material practice, but

rather still imagined to be organised primarily through what Deuze and Witschge (2018) describe as stable and universal professional cultures, occupational norms and routines. As far as digital journalism research is concerned, it is an important question because the possibilities that the digital affords for journalism research are not exhausted by current approaches that treat the digital either as a new object of study for established research methods, as an unmediated source of data, or as computational methods for the study of established practices.

In this final chapter I draw together the key contributions of this dissertation and provide some final reflections on their potential, limitations and implications for the study of digital news and journalism, as well as some research directions that deserve to be explored further.

## **6.1 Key Contributions**

As it should be clear by now, the aim of this thesis is not to provide a general theory of the transformations of journalism in the digital age. Instead, more modestly, this thesis aims to contribute towards the collective endeavour of understanding these transformations in two ways. Firstly, it proposes a research approach to address the interactions between digital objects, news work and journalism research. Secondly, it makes an empirical contribution by testing this approach in the context of three case studies and proposing concepts that help to make sense of some of the aspects of news in the digital age. My research approach and empirical investigations are “theoretically informed” (Becker, 1998), in the sense that, as detailed in Chapter 2, the conceptual underpinnings of socio-technical approaches to the study of journalism, and of device perspectives from digital social and media research, have shaped decisions about what to study and how to conduct research. In what follows, I will summarise each of the contributions of this dissertation.

### 6.1.1 News Devices: A Device Approach to Digital Journalism Research

This dissertation contributes to news and journalism research by developing a device-sensitive perspective to approaching the digital transformations of news and their implications for journalism research. The news device approach is a term I use to describe the combination of socio-material approaches to journalism with device-centred perspectives from digital social and media research. Inspired by Muniesa et al.'s (2007) notion of market devices, this concept draws attention both to how the digital offers sites, techniques and practices through which news work can play out, but also to how it can offer means to study both news and digital devices.

News device approaches carefully attend to how relations and practices are inscribed, supported and enacted by digital objects. This involves asking not just to how digital devices are used for journalism but also how digital devices treat, process or enact various aspects of news work, how they configure the relations between news and other domains, and, perhaps, what news becomes in the context of digital devices.

Two contributions are made through this approach. First, such a perspective invites an understanding of digital news and journalism as varied socio-material practices situated in and materialised through “fields of devices” (Ruppert et al., 2013), even if this account might not always correspond to news professionals’ understanding of their profession. Understanding the “digital” in digital journalism as the proliferation of diverse digital objects in mundane news settings invites us to attend to the specificities of their interactions with news and journalism.

In its empirical orientation towards the questions of when and how devices come to matter in situated practices, this approach can be distinguished from approaches that treat the question of impact of digital technologies on journalism in a monolithic and undifferentiated way, or that seek to address it exclusively on theoretical grounds.

The news device approach guides attention both to how digital devices shape *news* in particular situations, and towards examining how digital devices assemble and materialise *relations* between news and other areas and domains, from other digital content producers, to digital visual culture, commercial online platforms, and the online advertising and marketing industries. From this point of view, this whole project can be read as a contribution to understanding the ongoing practices of “hybridisation” or blending of news with other domains (Chadwick, 2013), even while journalistic discourses may focus on “boundary work” (see, e.g., Carlson & Lewis, 2015).

A second contribution pertains to the proposition that inquiries into the interactions between news and the digital should be extended to also cover the role of digital devices in journalism *research*. To this end, I discuss a set of methodological tactics by means of which digital devices can be configured to support news and journalism research. Following Marres (2017a), this process of configuration should be understood not as the application of well-established protocols but rather as methodological experiments or tests of the capacities of digital devices to inform the research orientations I was interested in. The contribution here is to describe these tactics in action and document the process of configuration in detail, from a description of the analytical capacities of each device and the “conditions of production” (Moats, 2016) of device data through the interactions between technical infrastructure and cultures of use, to corpus demarcation and analytical operations. The tactics I discuss are ones that I have devised or that I adapted from device-centred digital social and media research and are by no means exhaustive.

This second contribution of the news device approach to news and journalism research may also be understood as a way to extend the shift from “social” to “socio-technical” in accounting for news and journalism to the difference that the digital might make to sites and methods for news *research*, rather than trying to minimise their interference. It can also be seen as a contribution to the methodological questions raised by journalism socio-materiality researchers. While by no means the only or the best way to account for the interactions

between news work and digital devices, I hope these methodological tactics will be seen as a useful complement to existing ethnographic approaches that have been fruitfully used by researchers in this area so far.

### 6.1.2 The News Device Approach in Action: Three Empirical Applications

The main contribution of this dissertation is empirical. It consists in providing insights into the participation of three digital objects in news work and research by putting the device approach to test in the context of three case studies. The case studies took up the intersections between three aspects of news work and three digital objects (see Table 2).

Chapter	3	4	5
Area of news work	Making narrative and storytelling	Making infrastructure and coding	Making audience
Digital object	The network graph	The coding platform	The web tracker
News device	The network as storytelling device	GitHub as connective coding device	The tracker as audience marketplace device
Research technique	Multimodal analysis and graph semiotics	Platform interface and documentation analysis; Extracting and configuring platform metrics and date stamps to study characteristics of journalism coding on GitHub	Configuring web tracking detection on individual sites to examine tracking networks across websites with the Tracker Tracker and visual network exploration
Findings	5 types of network stories co-produced by network material affordances and journalism genre conventions	News work as connective coding; 4 characteristics of platform-specific news coding practices	Multiple tracking styles; Spectrum between amateur and professional audience marketplace configurations

Table 2: Summary of the three empirical applications of the news device approach.

In what follows I will summarise the configuration and findings of these case studies. These cases do not exhaust the many ways in which digital devices

participate in news and research. Rather, they illustrate three salient ways in which they do so and are of course only a handful of the many configurations that can be described as news devices. Moreover, there are of course many actors that participate in situations where digital devices and news intersect. As suggested in the Introduction, in the empirical world news happens through a multitude of intersecting digital objects and devices, but also professional norms and values, and is experienced alongside other sources and types of information. While the case studies have been constructed around one type of digital device, the chapters discuss the contributions of many intersecting devices.

### *6.1.2.1 Networks as Storytelling Devices*

The news device that the first empirical chapter focused on was the network diagram. I focused on this digital object because network visualisations are a landmark of digital visual culture and an increasingly important means to analyse and represent collective phenomena in a number of domains. In the context of journalistic knowledge making they are a less established but growing mode of visual representation. What also makes it interesting is that, unlike the other two digital objects examined, it is not a born digital or natively digital object, in the sense that it is not specific to digital environments but rather pre-exists them (Rogers, 2013).

In the spirit of Boczkowski and Mitchelstein's (2017) suggestion to build bridges with academic communities outside the news research community, the configuration of network diagrams as an object of study in this chapter was informed not just by concerns pertaining to news research but also by broader interests in the narrative potential of quantification practices, and of network visual exploration more specifically. Hence in this chapter network diagrams were problematised as narrative devices and the focus was on how network diagrams are performative of the way in which aspects of collective life are rendered into journalistic stories and the kinds of stories that are being told.

The capacities of networks to make a difference to narratives are approached

through their affordances, i.e. through the capacities of their visual attributes (e.g. node position, size and hue) and the network properties these attributes materialise (e.g. clustering, ego-networks, weak ties), to elicit narrative readings — in combination with other elements of the journalistic story (headline, lead paragraph, graph caption, etc.). What the news device perspective affords in this case is an analysis of narrative from the point of view of a particular storytelling device, the network diagram, which in this chapter I capture with the notion of network stories. I show how narrative readings are co-produced through the affordances of network graphs, the journalistic genres they are embedded in and the reader's own socio-cultural knowledge.

This perspective results in insights about meaning making around journalistic network stories. I find that there are recurring ways in which meaning is construed out of journalistic network stories which include exploring associations around single actors, detecting key players, mapping alliances and oppositions, exploring the evolution of associations over time, and revealing hidden ties. Multiple of these narrative readings can be encountered in a journalistic piece, particularly when these pieces include interactive network diagrams. While neither representative nor comprehensive, these can be seen as a contribution towards a vocabulary of narrative readings of networks in journalism as well as towards a protocol for the construal of narrative meaning out of networks.

The analytical approach I use in this chapter is different from those developed in the next two chapters, although there are also overlaps. The analysis developed in this chapter draws on well-established social-semiotic approaches to the study of meaning making in multimodal communicative texts. In doing so I aim to build a bridge towards existing analytical approaches and to show that these are well suited for the analysis of news devices. But given that multimodal analysis is a well-tested, well-established and well-documented approach, I draw on it to illustrate the construction of networks as narrative devices but do not make it a central part of the research problem that this thesis addresses. Instead, I focus the problematisation of this dissertation on less established but promising device-centred analytical approaches to the

digital. These bring new challenges that require more testing and elucidation before they can become useful ways of approaching digital news and journalism.

On the other hand, multimodal analysis and research tactics associated with device-centred approaches are not completely distinct. What this chapter shares with Chapter 5 is the presence of the network diagram. While Chapter 3 takes the network diagram as an object of analysis, the network diagram becomes part of the visual network exploration technique I use in Chapter 5. In the first case we are dealing with the use of network diagrams for communication purposes, while in the second one we are dealing with the use of networks for exploratory analysis. The twin problematisation of the network visualisation as object of study and method is thus realised across the two chapters. Moreover, multimodal analytical approaches used in this chapter are also present in the research techniques used in Chapter 5 as visual network exploration incorporates the multimodal construction and reading of networks. The distinctions between natively digital and pre-digital methods thus are blurred as natively digital approaches are co-extensive with and incorporate established methods in their assembly.

#### *6.1.2.2 GitHub as Connective Coding Device*

The second news device that I focus on is the online platform, and more specifically a code sharing platform and its code repositories. I focus on an online platform because they have become important actors in today's news media. GitHub is the largest code sharing platform and one of the most used for news work. GitHub's participation in news is particularly important to examine due to the specificity of this platform as a site for digital infrastructure making (Mackenzie, 2018), including that of news. GitHub was also relevant to study in the context of great interest from the news research community in the role of programming and open source software in news work.

The configuration of the device as an object of study in this chapter does not revolve around how the platform is used by journalists for open source coding,

but around the equally important question of how journalism coding is structured through GitHub. The question is informed by platform and software studies, and their sensitivity towards the conditions of possibility that software enables and software's relation with economic imperatives of platforms.

This analytical orientation allows us to address the question of the changing nature of news in the digital era by contributing to the understanding of one particular process, namely that of the platformisation of news. I provide new insights to this area of news transformations by examining the platformisation of journalism coding. Through user interface and platform documentation analysis, I show how GitHub platformises the coding work that makes use of the platform, i.e. how it turns these forms of work into productive parts of the platform ecosystem through processes of tracing, counting, calculating, recommending, intensifying, multiplying, archiving and mining participation. I call these forms of work connective coding to draw attention to the particular way in which journalism coding is co-produced with the platform. Connective coding expands the understanding of social coding beyond the connectedness or networking functionalities that GitHub enables to also capture the conversion of public coding, developer profiles and behaviours into assets that have the potential to be variously capitalised by the platform and its ecosystem.

The understanding of how the platform structures coding is also important for the configuration of the platform as a research device. Indeed, the same methods through which the platform formats, monitors, networks, ranks and metricises code repositories and user accounts, may afford modes of studying how journalism initiatives inhabit the platform.

Hence the second aspect of the news device approach that this chapter probes is how networked code repositories can be configured to enable the analysis of a collection of news code repositories on GitHub, with a particular focus on surfacing characteristics of platform-specific news coding practice. This has not been an easy task. A number of operations are required on the side of the researcher to align the analytical capacities of the platform with the research

question and there is a constant risk of mirroring the dominant analytical modes of the platform (what is popular and trending), which is a less insightful outcome. I illustrated how researchers can take advantage of the platform's research affordances while at the same time push back against them when they do not align with their own research questions and interests.

I experimented with configuring the capacities of platform metrics and date stamps to tell something about types of platform work, temporality of coding work and how journalism code is valued on GitHub. A number of insights emerged from these analyses.

As far as platform specific types of work are concerned, an analysis of the use of the forking function in my collection of repositories showed that journalism initiatives participate in the platform's code ecosystem with original work at a greater rate than numbers reported by other studies for the entire platform, while also engaging in imitative work. As far as temporality is concerned, many journalism repositories are largely ephemeral and do not conform with the platform's update culture. As far as how journalism code is valued on GitHub, I showed that the recursive nature of the platform's dominant programming publics shapes the valuation of domain-specific journalistic production and steers it towards materials that sustain developers and their software development work. Domain specificity in this case is reflected in the high valuation and ranking of non-code repositories addressed to journalists and non-programming publics, such as repositories containing datasets or data editorial and analytical guidelines. This analysis further nuances the characterisation of platform practices as connective coding by showing that, just as platforms are not fixed or stable arrangements, social practices are also not uniform materials to be platformised but rather are fluctuating, diverse and variable. This mix of modes of valuation reflected in the top starred journalism repositories attests to how, by entering the platform ecosystem, journalism objects may open themselves up to other modes of valuation.

### *6.1.2.3 Trackers as Audience Marketplace Devices*

The news device that the final empirical chapter focuses on is web trackers. Web tracking techniques and associated data mining practices are controversial and have been studied in relation to a number of issues, from surveillance to security, web economies and digital labour. In this chapter web trackers are configured as news devices to explore the role that they play in the business side of advertising-supported news, and more specifically in the making of audience products. I focus on web trackers because in the context of the post-exposure audience marketplace, digital objects such as cookies and other web tracking devices play an increasingly prominent role. My interest in these objects was also prompted by the fake news scandal and associated debates about the economics of junk viral content production, which is why in this chapter I trace the tracking practices of a small corpus of mainstream and junk news sites active around the 2016 US presidential elections.

I examine the tracking infrastructures of these websites to understand what they can bring to our knowledge about the audience marketplaces in which various forms of digital cultural production operate. Audience marketplace configurations in this context can be understood as assemblages of actors that variously participate in audience commodification through web tracking.

To show what a material-empirical approach can bring to the study of media audience commodification I use a technique that configures the tracker detection and classification capacities of the popular Ghostery privacy protection browser extension with visual network exploration. I document the difficulties that come with such an analysis due to the instability of the object of study and the dynamic character of tracking, as well as how the technique is shaping the picture of the phenomenon obtained.

I qualitatively explore post-exposure audience marketplace configurations as materialised through the invisible tracking infrastructures of sites associated with two forms of advertising-supported digital cultural production. A number of insights about web tracking practices and the relations through which the

business side of news plays out can be taken from this analysis. From the point of view of the tracking infrastructures of these websites, junk news, and to a much greater degree mainstream news, are deeply entangled with the complex structures of the online advertising and marketing industries. This tracking infrastructure is indicative of the precarity of business models and revenue streams of news organisations, which places increasing pressure to sustain resource intensive news production through complex and invasive advertising structures, that rely on aggressive data collection practices, with little transparency and accountability towards other participants in the audience marketplace.

It is not only the online advertising and marketing industries that shape the digital infrastructures of news, but tracking practices and infrastructures are also shaped by modes of cultural production. Different forms of digital cultural production have their own practices and infrastructures for intensifying, measuring, analysing and monetising the activities of their audiences. This study illustrated several such audience marketplace configurations, placed on a spectrum from amateur audience marketplace configurations specific to the long tail of the internet, more moderate in tracking and heavily reliant on social media to attract traffic and ad networks to monetize it, to professionalized configurations where tracking is intensified and customised through specialised services and large numbers of media buying and selling intermediaries, as well as data brokers.

Finally, asymmetries between participants in the audience marketplace cut across all these configurations, from monopolistic tendencies of big online platforms in the online advertising industry, to economic pressures on publishers which increasingly become vehicles for the aggressive data collection practices of advertising industry actors, and finally audience members who increasingly bear responsibility for the implications of these market configurations for their privacy and security, aided by data protection software and regulations (such as the recently enforced EU General Data Protection Regulation).

## 6.2 Implications for the Study of News and Journalism

In this section, I offer reflections on what the contributions discussed in the previous section might mean for the study of digital news and journalism more generally, as well as for the areas of journalism studies and digital social and media research. While I do not want to generalise too much from my three case studies, I will add a few considerations on the potential and challenges that come with these approaches based on my empirical research.

Digital media, online platforms and the web, for short, the digital, are present in journalism research mainly as either a research topic or as a source of data about news and news work. The contribution of this dissertation has been to outline a way to approach digital devices at once as research objects and as being able to be configured into device-specific modes of knowing the interactions between news and digital devices.

This is not the attractive promise of big data to deliver unmediated access to large amounts of granular data about entire populations, and computational techniques that would enable large-scale analyses of these datasets. In this dissertation I illustrated that the promise of device-driven research perspectives consists in the pairing of critical research with configuring the analytical modes inscribed in devices to understand their interactions with issues and practices. This is surely a more modest and, to some, less attractive and more difficult promise. But what makes this approach difficult is also where its potential lies.

A news device approach can make available new sites and research techniques to address key questions about news. But the conceptual and methodological outlooks that underpin it, whether that is socio-material approaches, device-driven research, digital methods, platform studies or software studies, will also modify these questions, objects of study and research problems. By treating the digital device not just as a collection of data but also as an object of investigation, the ambiguity about the extent to which you are studying news practices or device effects (present, for example in Chapter 4 concerned with platform specific journalism coding), has implications for how the object of

news and journalism research is conceived. The conceptual and methodological underpinnings of this approach may also introduce different perspectives on what matters in the interactions between digital devices and news, and thus generate possibilities to ask fresh questions and raise new research problems. For example, one common modification when it comes to research questions pertains to the switch from use-centred questions (i.e., how a given device is used in a given practice), to materiality sensitive questions of how a device treats or configures a practice or an issue. This was the case for example in Chapter 4 where I decided not to focus on the question of how journalists use GitHub to develop open source software, which could potentially be seen as better aligned with the commitments of journalism studies, and instead focused on how the platform structures journalism coding. While this modification may seem trivial, this shift is intended to re-focalise the research perspective to account for agency not as solely the domain of the users but as being distributed between users and platform. This in turn has implications for the operationalisation of the question, i.e. for how the different elements of the research apparatus are aligned to address question.

This interference, which I see as positive, of the conceptual and methodological outlooks that underpin the news device approach with objects of study and research problems in news research, may also be seen as a way to set up “two-way streets” between the journalism research community and other research communities, as Boczkowski and Mitchelstein (2017) have suggested. This dissertation illustrated an opening up of news and journalism research towards materiality-sensitive new media studies and digital sociology. I am not arguing that journalism researchers should become new media researchers or digital social researchers, but rather suggesting that one possible direction that the study of cross-media news work might further explore is the potential of device-centred perspectives from digital social and media research, software studies and platform studies, as several journalism researchers have already begun to do.

As mentioned above, news device approaches come with many challenges, and difficult ones to resolve for researchers used to working within more

established methodological frameworks. Embracing these approaches would also involve embracing particular ways of addressing these challenges, which may further unsettle how news and journalism are studied. I will briefly discuss some of these challenges below. I will not aim to reassure researchers by providing principles through which each of these can be safely averted or overcome once and for all. As I suggested above, these research approaches do not necessarily aim to remove the interference of the device with the object of study or with the data. The solution they propose is to modify the research problematisation and make them part of the topic to be investigated. Indeed, what constitutes a problem depends on how the research apparatus is configured (for a good discussion on this point, see Weltevrede, 2016).

One risk that the case of studying journalism coding on GitHub surfaced was that the reliance on “methods of the medium” would pull the research in the direction of reproducing the modes of analysis that the platform offers (e.g. trending and popular content and influential users), without modifying them towards the understanding of aspects of platform-specific coding practice. Whether this pull is a good or a bad thing ultimately depends on the research question and the objective of the research. In any case, a number of research techniques are available to researchers to align the analytical affordances of devices with the questions of social and media research (see, e.g., Marres, 2017a; Rogers, 2013; Weltevrede, 2016). Researchers are also encouraged to develop their own, as every device will require its own research techniques. In my empirical studies, I relied on a handful of approaches developed in the context of previous research, such as the move from frequency to relational analyses which I used in Chapter 5 (for more on this technique, see, e.g., Marres & Gerlitz, 2015). In sum, one key to mitigating this risk, as Weltevrede (2016) suggests, stands in the “quality of configuration” of the research apparatus through the alignment of questions, with data and research techniques.

Another reason for hesitation concerns issues of data access and data collection. The reliance on platform APIs (as has been the case in Chapter 4) opens up questions about what data is made available and how data is

structured via APIs. While what is available through APIs and the terms of use vary from platform to platform, APIs have politics, as Puschmann and Burgess (2013) suggest. More recently, there has been talk of a possible crisis of API research in social media studies, as platforms are restricting access to data and social datasets are increasingly put into question following recent scandals around fake news and misinformation (see, e.g., Rogers, 2018). My approach when it comes to accessing data via the GitHub API in Chapter 4, following Marres and Weltevrede (2013), has been to make the affordances of this API and how it structures knowledge making, a topic of investigation. Investigating and not abandoning APIs is increasingly important as journalists themselves are using APIs in their work more and more. Similarly, the reliance on a commercial tool such as Ghostery in Chapter 5 can cause hesitation. The researcher is dependent on the tracker detection techniques of the tool which are tied to the service's own goals. This is not an easy problem to solve but, as I suggest in my chapter, it can be mitigated by making the construction of tracking detection through this tool part of the research object and the findings.

Linked to these are also concerns about the opacity and the constantly changing nature of the often algorithmic processes that underpin digital devices. In the case of my research the issue of opacity came up in the case of the GitHub trends algorithm which plays a role in shaping engagement with code repositories. While we know what platform activities the algorithm takes into account, we do not know exactly how they are configured and what weight they are given. The instability of digital devices surfaced in relation to the tracker detection service used in Chapter 5. For example, Ghostery has changed the classification of trackers it detects at various points during this research. But device-centred approaches do not abandon digital devices because of these challenges but instead seek to make the configuration of the research apparatus sensitive to these characteristics so as to be able to study them. Dealing with these requires these approaches to be flexible and adaptable both to the shifting nature of the device and in terms of their object of inquiry in order to allow these “epistemic trouble[s]” to become part of the investigation (Marres and Weltevrede, 2013; on device-driven research

approaches as flexible and adaptable see also Weltevrede, 2016 and Niederer, 2016). As far as opacity is concerned, even if, as proprietary “coded object[s]” algorithms might not be available to us for inspection, Bucher (2018) argues that there are still many ways in which we can make sense of them. This is because algorithms are not just proprietary code but many different things depending on the configurations that they enter, and hence many different methodological tactics can be devised to capture multiple aspects of them (Bucher, 2018, p.150), even if we may never know them exhaustively.

Bucher’s argument brings to what may be seen as another difficulty, namely the always partial nature of the accounts we produce. This dissertation provides multiple partial representations of the interactions between digital devices and news work: the role of digital devices in making narrative, the role of digital devices in making news infrastructure, and their role in making audience products. The particularities of these partial accounts are shaped by the device perspective and the various approaches used to treat these interactions: reading the role of the device from the content of news texts, reading the role of the device from how it organises code repositories, reading journalism coding from its platform-specific networked character, and reading audience making practices from the point of view of tracking devices embedded in websites.

In this dissertation I did not strive for one response or one approach that would enable me to tame the question of the impact of the digital on news and journalism, and the direction that transformations are taking, in all its complexity, once and for all. I preferred the more modest approach of multiplying partial accounts of particular interactions and describing the different operations through which digital objects come to matter in relation to various aspects of news work. This is akin to what in the context of controversy mapping has been called “second-degree objectivity”, which is obtained through the “multiplication of different viewpoints”, “from diversity rather than from uniformity” (Venturini & Munk, forthcoming, p. 177; see also Venturini, 2012).

These evaluations are not only partial and particular, but also not definitive given the ever-shifting nature of devices, which is why the emphasis in this dissertation has not been only on the evaluations of their capacities to shape practices and relations but also on describing the means by which others can configure their own assessments.<sup>70</sup>

## 6.3 Thinking Ahead: Participatory Approaches in News

### Device Research

Thinking ahead, there are of course many more devices and methodological tactics that could be discussed under the rubric of news devices and associated research approaches. As digital devices evolve, so will device-centred modes of studying them continue to develop. There are also many ways in which the explorations I developed in my empirical chapters could be extended and improved. I offer a few suggestions for future research in the chapters themselves. I will not revisit these in this section and will instead take this final section as an opportunity to more explicitly articulate some of the recurring but hitherto underdeveloped threads that ran through this dissertation into possible future research directions.

As I conclude this dissertation, we find ourselves in a particularly crucial moment for inquiries into the interactions between news and digital devices, as the debates of recent years about the role of devices such as platforms in opinion manipulation, misinformation and the weakening of news institutions, demand increased scrutiny and evaluation.

The approach suggested in this dissertation was that the critical interrogation of digital devices and their implications for news practices and relations does not need to be separated from the use of analytical affordances of digital devices and computation, but that, instead, they can be productively combined.

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<sup>70</sup> To this end, some of the research in this dissertation (Chapter 5) has in earlier versions been published as “methodological recipes” that would enable others to investigate the phenomenon of “fake news”, as part of *A Field Guide to “Fake News” and Other Information Disorders* (Bounegru et al., 2018).

From this point of view, this is a particularly fruitful moment. This is because critical interventions around the digital that combine interrogation of digital devices with configuring their analytical capacities to serve these inquiries, are increasingly occurring not only in academic settings but in many other areas of society as well, from art to journalism to everyday life. Journalism is one particularly important area where these inquiries have been thriving over the past years, in practices such as algorithmic accountability reporting (Diakopoulos, 2015) and data journalism (Gray & Bounegru, forthcoming).

Elsewhere colleagues and I proposed the notion of “data infrastructure literacy” to draw attention to such practices that focus not just on the ability to work with datasets, but also on the ability to use datasets to critically interrogate and intervene around the socio-technical arrangements through which data is produced and manipulated (Gray et al., 2018). We discussed examples from digital social and media research similar to the kinds of interventions discussed in this dissertation, but also from data journalism and data activism. In data journalism and algorithmic accountability reporting, there are numerous projects that critically and tactically investigate, challenge and mobilise datasets, data infrastructures and algorithmic processes to intervene in defining the fields of action and possibility enabled by digital infrastructures and devices, from double-voter detection systems, to migrant deaths data collection systems, and criminal re-offence risk assessment tools. A look at ProPublica’s Machine Bias series will provide many other examples.<sup>71</sup> What all the examples discussed in our research shared, was working to inventively align the analytical affordances of data infrastructures with the aims of critical interrogation, challenging and intervening in the composition of the digital infrastructures that permeate our lives and professional practices.

Thinking ahead, given the importance of the task at hand and the commitment of many stakeholders, including from journalism, in the implications of digital devices for society, participatory approaches to inquiries into and with digital devices might be a direction worth exploring further. In this respect, participatory, engaged, experimental and creative research approaches from

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<sup>71</sup> <https://www.propublica.org/series/machine-bias/p3>

STS could serve as inspiration (see, e.g., Lezaun, Marres, & Tironi, 2016; Marres, Guggenheim, & Wilkie, 2018; Chilvers & Kearnes, 2015; Sismondo, 2008). Unlike approaches that demand such research to take “critical distance” from the studied phenomenon to truly understand its implications, participatory approaches advocate for “critical proximity” (Birkbak, Petersen, Elgaard Jensen, 2015; Latour, 2005a). Such critical proximity would see collaborations set up with various stakeholders, such as journalists, to configure inquiries into and with digital devices. These inquiries would take advantage of problematisations already developed in everyday life and in their own professional practices (on this point see also Marres, 2017a; Marres et al., 2018).

Elsewhere, I experimented with this approach by bringing together data journalists and journalism researchers to develop accounts of how they integrate critical interrogation of datafication with data work in their day to day practices, and how such practices may be modified towards what, following Agre, we “critical data practice” (Gray & Bounegru, forthcoming). The news device approach as developed in some parts of this dissertation may be understood as participatory in two ways. First, in a sense, as co-developed with the participation of digital devices, as research questions and their operationalisation are partly informed by the operations of digital devices. Secondly, efforts towards configuring inquiries with actors other than digital devices have been present in Chapter 5 where the problematisation of fake news from an economic perspective has been informed by journalistic investigations into the topic, such as the work of BuzzFeed News on this issue, and versions of this work have been published as journalistic investigations.<sup>72</sup>

The device perspective offers ways of examining, exploring and experimenting with the role of the digital in news and journalism work and research. Rather than treating the digital as a monolithic development with unified effects, it offers a way to look at the mutual articulation between devices and practices in particular settings. Rather than looking at the analytical capacities of digital data from these devices either as biased or as giving new unmediated access to

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<sup>72</sup> <https://www.buzzfeednews.com/article/craigsilverman/fake-news-real-ads>

social interactions through big data, the device perspective opens up space for reflecting on what it means for digital devices and data to articulate concerns, issues and practices related to news and journalism in particular ways. I hope the approaches discussed in this dissertation may be taken as an invitation to explore how digital technologies are involved in modifying relations and practices in news and news research in a participatory manner, including in collaboration with various publics who are affected by such changes.