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News devices

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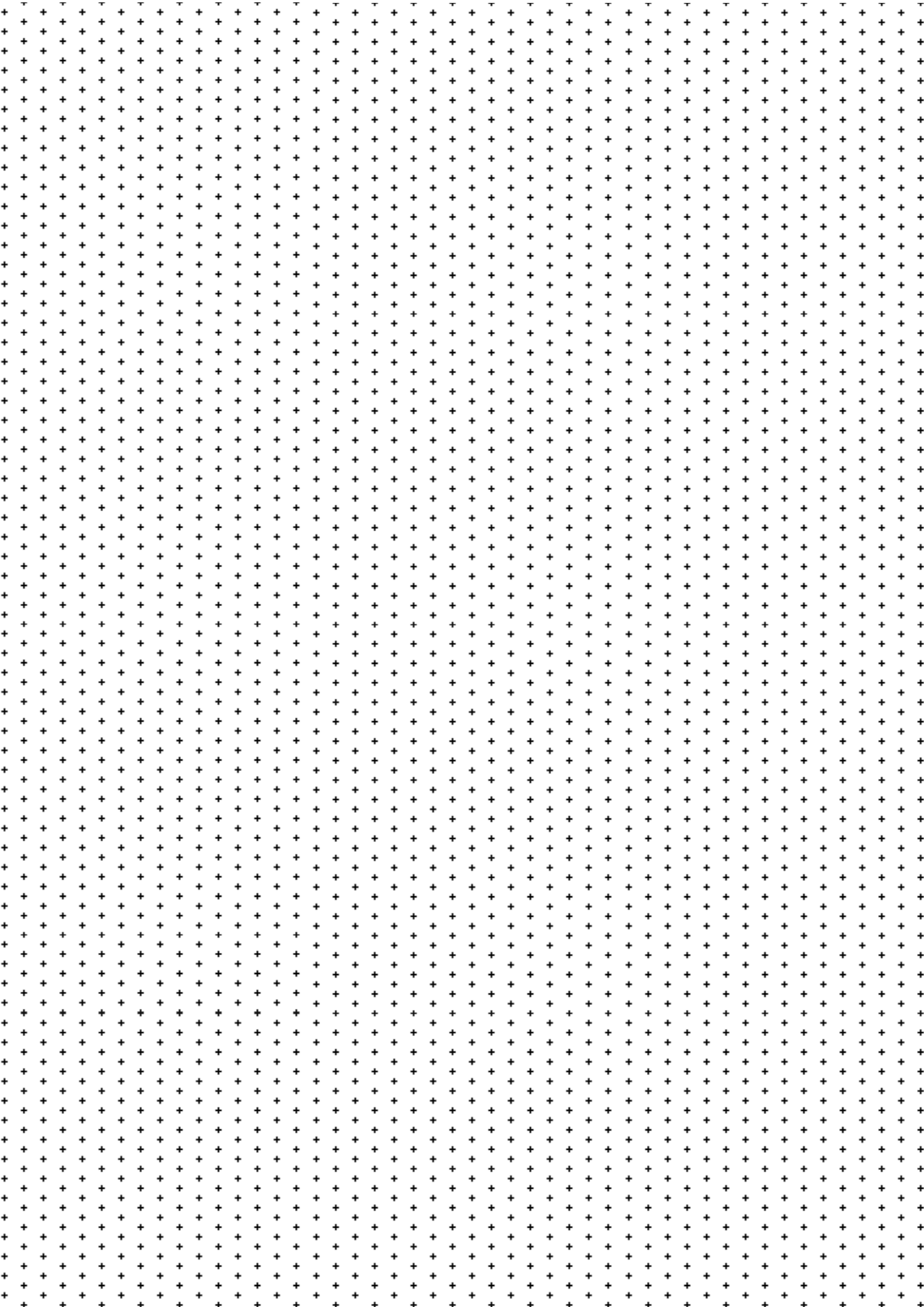
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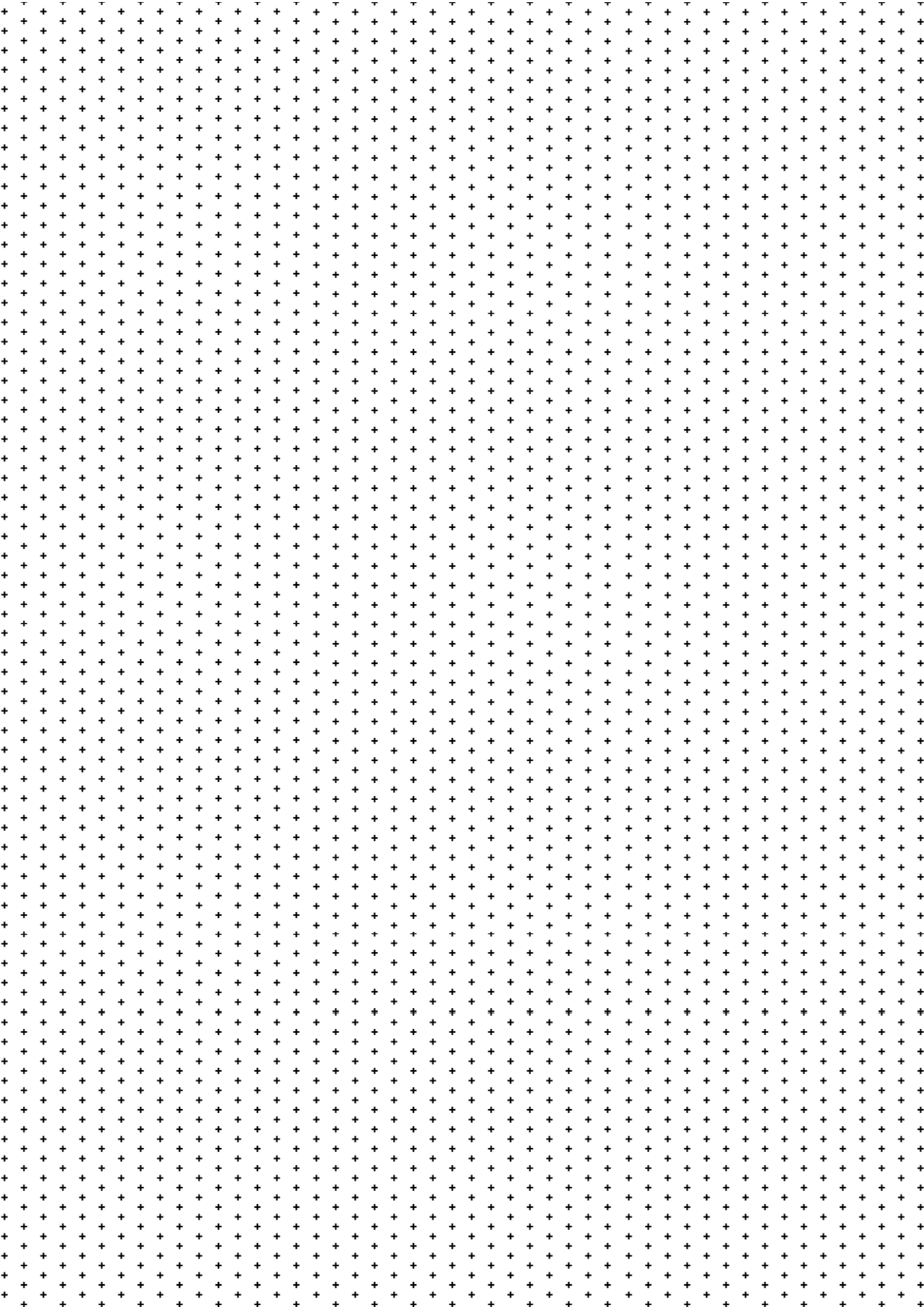
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Thesis Summary



News Devices: How Digital Objects Participate in News and Research

In this thesis I examine how digital objects participate in news work and research. I focus on the interactions between digital objects, news work and journalism research because news is increasingly taking place in and through a variety of digital devices, from websites, to search engines, online platforms, apps, bots, web analytics, data analysis and visualisation tools. These devices are also increasingly used as resources in digital research. Both these developments are often met with both excitement and concern and their implications are yet to be fully understood.

To address these interactions, I propose the news device research approach. This approach combines STS-inspired socio-material approaches from news and journalism research and device-centred perspectives from digital social and media research. Inspired by Muniesa, Millo and Callon's notion of market devices (2007), news devices refers to objects that participate in news, and the news device approach refers to research outlooks and techniques that treat news work as co-produced through interactions with digital devices, and that capitalise on the medium-specific analytical affordances of these devices to study aspects of both news and digital devices. That is to say, the notion of news devices aims to draw attention not only to how digital devices participate in news work but also to what they may afford for journalism research. In relation to the former, what is important in this project is not the recognition *that* the material participates in news making (this is something that has been recognised for a long time). The aim is rather to empirically explore *when* and *how* it participates and with *what consequences* for the situations in which it is embedded. In relation to the latter, this dissertation does not assume that digital devices straightforwardly and unproblematically hold a promise for news research. But it acknowledges that, given that news and its analysis are increasingly occurring through digital devices, it is important to empirically examine how these devices can be configured to support ways of knowing the news in journalism research.

I illustrate the news device approach through three case studies. Each of these examines different ways in which the digital matters in news and news work

and suggests research techniques by means of which these differences can be attended to. As far as areas of news work are concerned, the case studies cover the participation of digital devices in familiar journalism areas such as that of news stories, as well as less visible ones such as news software development, and the business aspects of news. As far as digital objects are concerned, I focus on three: network diagrams, the code sharing platform GitHub and web trackers. I explore their intersections paying attention to how they shape news work but also to how they shape relations between news and other phenomena and domains, from digital visual culture, to commercial online platforms, the online advertising and marketing industries, and “fake news” or junk viral content production.

In **Chapter 2** I discuss the two bodies of work that I draw on and contribute to, namely STS-inspired news and journalism research and device-centred approaches to digital social and media research. I start developing the notion of the news device as a way to think through how these combined approaches can be brought to bear on the study of digital news making, circulation and use, and the relations and practices that underpin these areas. I focus on these bodies of work because of their widely recognised, rich and nuanced approach to the mutual shaping of technologies and practices, drawing particularly on actor-network-theory (ANT). A number of insights from socio-material approaches in journalism research inform the news device approach, from the sensibility towards the materiality of digital news work, to approaching this work as socio-technical processes, and providing suggestions for aspects of news work in need of further scrutiny. Device-centred approaches from digital social and media research help to further specify and advance this approach, namely by drawing attention to how the digital offers not only sites through which news work can play out, but also to how it can offer medium-specific means to study both news and digital devices. I draw on approaches and insights from digital sociology, software studies, platform studies and research techniques known as digital methods (Rogers, 2013) or interface methods (Marres & Gerlitz, 2015). I end with a discussion of considerations that informed the development of my case studies as well as final aspects of research design.

Chapter 3 focuses on the network diagram as a news device. More specifically, I examine how network graphs, the de facto diagram type of the digital age, make a difference to journalistic narratives about collective life. I examine the narrative affordances of network diagrams, i.e. their capacities to elicit narrative readings in combination with other elements of the journalistic story, through multimodal analysis and approaches from the visual semiotics of network graphs. Although neither representative nor comprehensive, the findings of this chapter suggest that there are patterns in the narrative reading of networks. I describe five recurring narrative readings that the material affordances of network diagrams cue in a collection of journalism pieces. These include: exploring associations around single actors, detecting key players, mapping alliances and oppositions, exploring the evolution of associations over time, and revealing hidden ties. The chapter can be seen as a contribution towards elucidating the meaning-making capacities of these defining knowledge-making devices in the digital age. This has been done by contributing towards an analytical approach to the narrative meaning of networks as well as towards a vocabulary of narratives that networks evoke in journalistic stories. Methodologically, the contribution of this chapter is to illustrate that existing analytical approaches such as multimodal analysis are well suited to support research that takes a news device approach. While this chapter treats the network diagram as an object of research, in Chapter 5 the network diagram becomes part of the visual network exploration method. The double problematisation of the network as object of study and method is thus illustrated across the two chapters. Moreover, the integration of multimodal analysis in the visual network exploration method used in Chapter 5 also illustrates the continuity between research techniques informed by medium-specificity and more established research methods.

Chapter 4 focuses on the online platform as a news device, and more specifically the code sharing platform GitHub. It is a contribution to platform studies, the platformisation of news and to the study of coding and software development in journalism. In the first part of the chapter I analyse GitHub's user interface features, help pages, its development blog and tech press to

understand how GitHub platformises coding, i.e. how it configures coding work into an economically valuable contribution to the platform ecosystem by making participation in the platform traceable and calculable through its technical infrastructure. Drawing on van Dijck (2013) I propose to understand coding on GitHub as connective coding. Unlike the notion of social coding, which draws attention to how GitHub enables connectedness and networking within the software development community, connective coding draws attention to how public coding, developer profiles and behaviours are simultaneously converted into asset streams to be variously capitalised by the platform and its ecosystem. In the second part of the chapter I explore how networked code repositories can be configured into research devices to understand aspects of coding practice in a collection of news code repositories. I examine how date stamps and repository collaboration and popularity metrics can be configured to profile types of platform work, the temporality of coding work and how journalism code is valued on GitHub. I find that journalism coding does not always keep up with platform values (such as its update culture) and that the platform's dominant programming publics shape the valuation of domain-specific journalistic production on the platform. This analysis further nuances the characterisation of platform practices as connective coding by showing that, just as platforms as not fixed or stable arrangements, social practices are also not uniform materials to be platformised but fluctuating, diverse and variable. Methodologically, I make a contribution by exploring how the platform can be configured for news research. I illustrate techniques by means of which researchers can use the platform's analytical capacities at the same time as trying to push back against their logics to align them with their own research questions and interests.

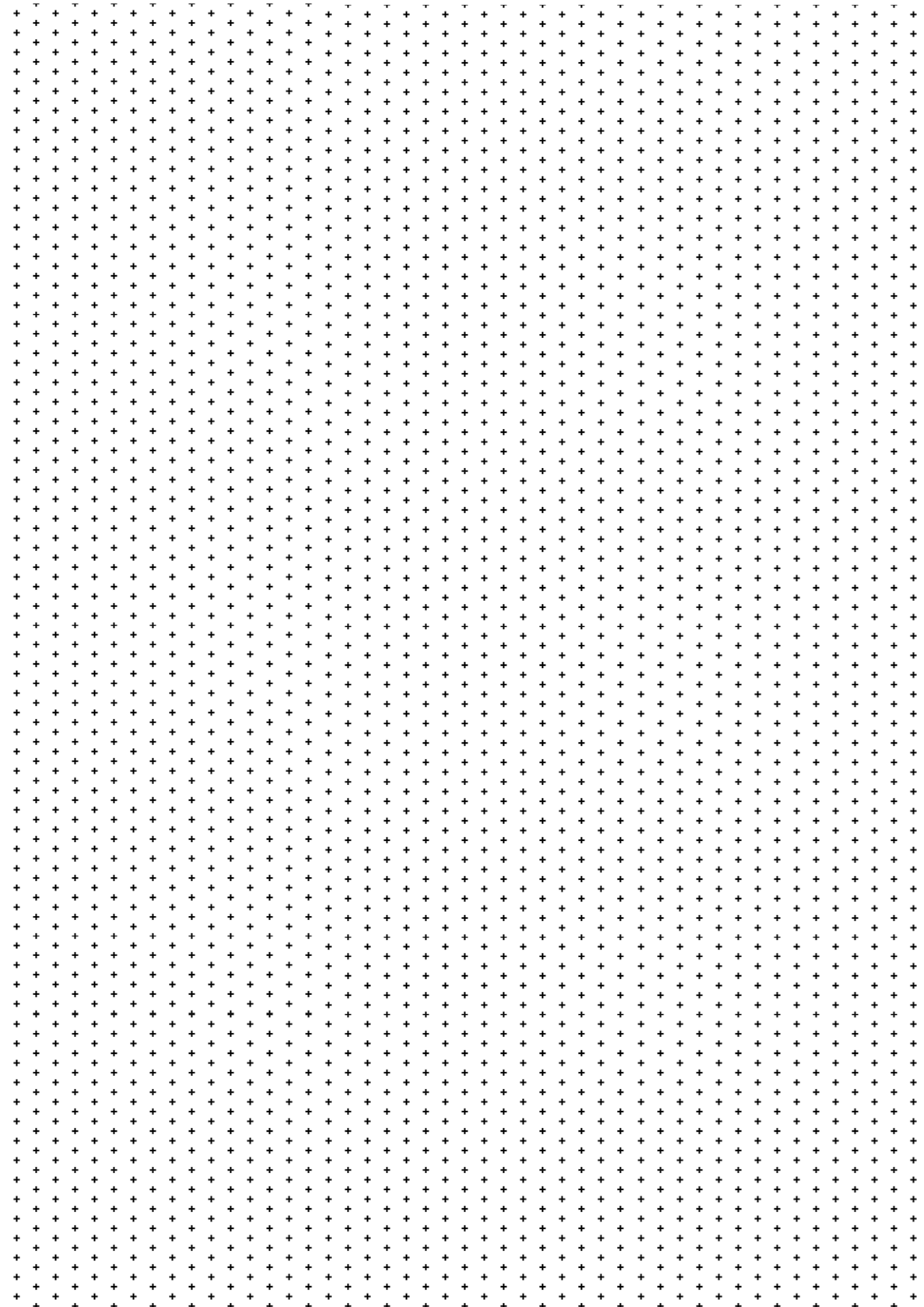
Chapter 5 takes the “fake news” scandal as an occasion to focus on web trackers as news devices and to address the problematic relationship between the online advertising and marketing industries and two forms of digital cultural production: news and viral junk content. To do so it draws on audience economics and socio-material approaches to digital media to study audience commodification from the point of view of web tracking devices. I focus on web trackers as audience marketplace devices because in the context

of the “post-exposure audience marketplace” (Napoli, 2011) in which advertising-supported digital cultural production is increasingly embedded, digital objects such as cookies and other web tracking devices play an increasingly prominent role. To explore how audience commodification can be approached from a digital device perspective, I extract the third-party tracking mechanisms embedded in a collection of pages from mainstream and junk news sites and examine how these devices enact audience marketplace configurations. This analysis provides a window into the audience marketplace practices in which legal initiatives such as the EU General Data Protection Regulation (GDPR) are aiming to intervene. I show that tracking infrastructures are shaped by cultural production dynamics and illustrate a few such audience marketplace configurations. These range from professionalised configurations where tracking is intensified and customised through specialised services and large numbers of intermediaries, to less complex configurations specific to less professionalised publishing operations, which rely on fewer tracking services, most prominently on social media and ad networks. As far as the configurability of web tracking detection for news research is concerned, I document how the technique is shaping the picture of the phenomenon obtained and the difficulties that come with such a research technique due to the instability of the object of study and due to technical aspects of how tracking is detected.

I **conclude** this dissertation by recapitulating the key contributions of this research project and providing some final reflections on their opportunities, challenges and implications for the study of digital news and journalism, as well as some research directions to further explore. I start by revisiting the contributions made through the news device approach and its three empirical applications: the study of networks as storytelling devices, of GitHub as a connective coding device, and of web trackers as audience marketplace device. I discuss what distinguishes this approach from other approaches to the impact of digital technologies on journalism. I also suggest that the promise of news device perspectives is different from that of big data or computational approaches to social and media studies. Unlike these, its strength consists in blending critical research with repurposing the analytical modes inscribed in

devices to understand their interplays with issues and practices. As far as implications for news and journalism research are concerned, I suggested that, while the approach can offer new sites and research techniques to address important questions about digital news and journalism, its implications go further than that. This is because the conceptual and methodological outlooks that underpin it also affect the questions asked and the research problems that are formulated. I consider this interference as positive as it may open up possibilities to address what in Chapter 2 was discussed as perceived blind spots at work in news and journalism research. I also consider it positive as it may be seen as a way to open up meaningful dialogues between the journalism research community and other research communities. I suggest that embracing this approach also involves embracing its particular ways of addressing challenges, which may further unsettle how news and journalism are studied. I end by articulating a present but underdeveloped thread that ran through this dissertation into a direction that future research might consider. It refers to participatory approaches to inquiries into and with digital devices that would see stakeholders affected by such devices, such as journalists, meaningfully participate in the configuration of research inquiries.

Nederlandstalige Samenvatting



News Devices: Hoe Digital Objects Een Rol Spelen in Nieuws en Onderzoek Naar Nieuws

In dit proefschrift bestudeer ik hoe digital objects deel uitmaken van journalistiek en een plaats hebben verworven binnen journalism studies. Centraal staat de wisselwerking tussen digital objects, journalistiek en journalism studies omdat nieuws steeds meer digitaal vorm krijgt en gebruik maakt van digital devices zoals websites, zoekmachines, online platformen, apps, bots, webstatistieken, data-analyse en visualisatietools. Deze instrumenten worden ook steeds vaker onderdeel van digital research. In beide gevallen wordt deze evolutie zowel met enthousiasme als met bezorgdheid onthaald, en moet een getrouw beeld van de eigenlijke implicaties ervan nog gevormd worden.

Om deze wisselwerking te onderzoeken vertrek ik vanuit een news device research approach. Deze koppelt op STS geïnspireerde socio-materiële benaderingen uit journalism studies aan instrumentele perspectieven zoals gehanteerd in digital media studies en digital social research. Het begrip 'news device' is geïnspireerd op het begrip 'market device' van Muniesa, Millo en Callon (2007) en verwijst naar objecten die onderdeel zijn van nieuws. De benadering vanuit news devices verwijst naar perspectieven die journalistiek aanzien als een co-productie voortvloeiend uit deze interactie. De mediums specifieke affordances van deze devices zijn aanzetpunt voor onderzoek naar nieuws en digital devices. News devices hebben dus niet enkel betrekking op de manier waarop ze ingezet kunnen worden binnen journalistiek, maar evenzeer hoe ze een bijdrage kunnen leveren aan onderzoek binnen journalism studies.

In dat eerste perspectief zal het in dit proefschrift niet zozeer gaan over de vaststelling dat materialiteit onderdeel is van de journalistieke praxis; dat is al lange tijd erkend. Doelstelling is eerder om empirisch na te gaan wanneer, hoe, waar en met welke gevolgen deze co-productie zich voltrekt. Wat het tweede perspectief betreft erkent dit proefschrift dat, vermits nieuwsproductie en journalism studies in toenemende mate digitale instrumenten gebruiken, het

van belang is om een duidelijk en empirisch ondersteund beeld te verkrijgen van hoe deze instrumenten kunnen worden geconfigureerd op een dusdanige manier dat ze news research ondersteunen.

De news device approach zal ik illustreren aan de hand van drie casestudies. Deze verduidelijken de verschillende wijzen waarop digitale materie een impact heeft op journalistiek en op journalism studies. De casestudies reiken ook methoden aan om deze aanwezigheid in kaart te brengen en te onderzoeken. De case studies tonen aan hoe digital devices invloed hebben op dagelijkse journalistieke praktijken zoals storytelling. Ze tonen ook aan dat er minder zichtbare impact is, zoals de ontwikkeling van specifieke nieuwssoftware en op de bedrijfsmatige aspecten van mediabedrijven.

In dit proefschrift richt ik me op drie digital objects: netwerkdiagrammen, GitHub als codesharingplatform en webtrackers. Ik verken waar deze digital objects raakpunten hebben, hoe ze news practices vorm geven, hoe ze bijdragen aan domeinen zoals de digitale beeldcultuur, commerciële online platformen en economische aspecten van mediabedrijven. Ook is er aandacht voor de productie van virale junk content en 'fake news'.

In **Hoofdstuk 2** bespreek ik het onderzoeksveld waaruit ik put en waartoe ik een bijdrage wil leveren. Hier bespreek ik de op STS geïnspireerde benadering van journalism studies en de instrumentele bijdrage van digital social studies en digital media studies. Ik ontwikkel het begrip 'news devices' en reflecteer op hoe beide gecombineerd kunnen worden ingezet in onderzoek naar de productie, distributie en consumptie van digitaal nieuws en naar digital news practices. Deze werkwijze biedt een rijk en genuanceerd perspectief op de samenhang tussen technologie en practices door zich te beroepen op de Actor-Netwerktheorie (ANT). De news devices benadering baseert zich op een groot aantal inzichten die zijn voortgekomen uit socio-materiële benaderingen binnen journalism studies. Deze gaan van bewustzijn van materialiteit in digital news practices naar journalistiek als verbonden met socio-technologische processen, alsook specifieke aspecten van journalistieke practices.

De instrumentele perspectieven uit digital social research en uit digital media studies versterken de news devices approach door aandacht te hebben voor de verschillende manieren waarop het digitale perspectief analysemogelijkheden aanreikt voor journalistieke practices maar ook mediumspecifieke parameters naar voren schuift voor onderzoek naar digitaal nieuws. Hierbij maak ik gebruik van benaderingen en inzichten uit de digital sociology, uit software studies, platform studies zoals deze begrepen worden onder ‘digital methods’ (Rogers, 2013) of ‘interface methods’ (Marres & Gerlitz, 2015). Aan het einde van dit hoofdstuk bespreek ik de overwegingen van waaruit gekozen werd voor de case studies en de manier waarop ze in dit proefschrift onderzocht werden.

Hoofdstuk 3 behandelt het netwerkdiagram als news device. Ik onderzoek hoe network graphics, het ‘de facto-diagramtype’ van het digitale tijdperk, vorm geeft aan journalistieke narratie. Ik onderzoek de narratieve affordances van deze diagrammen via multimodale analyse en grafiekensemiotiek. De bevindingen van dit hoofdstuk, hoewel slechts indicatief en niet representatief, wijzen op het bestaan van patronen in narratieve lezingen van netwerken. Ik beschrijf vijf terugkerende lezingen die de materiële affordances van netwerkdiagrammen in journalistieke content oproepen. Het gaat dan om het verkennen van connecties van individuele actoren, het bepalen van de hoofdrolspelers, van bondgenootschappen en allianties, en de manier waarop deze verschuiven doorheen een tijdsframe. Dit hoofdstuk wil meer duidelijkheid verschaffen over de manier waarop deze instrumenten uitgroeien tot instrumenten van betekenisgeving. Zo omvat het hoofdstuk een analytische benadering van netwerken als vertellingen en de manier waarop deze een lezing aanreiken.

In methodologisch perspectief wenst dit hoofdstuk bij te dragen aan het begrip dat een news device benadering prima kan samengaan met andere analytische benaderingen, zoals multimodale analyse. Waar in dit hoofdstuk het netwerkdiagram centraal staat in mijn analyse, zal het in hoofdstuk 5 een onderdeel vormen van de visual network exploration method. Op die manier wordt het netwerkdiagram dubbel aangepakt, enerzijds als onderzoeksobject en

anderzijds als methode. We tonen aan dat er continuïteit is tussen onderzoeksmethoden die geïnspireerd zijn door mediumspecificiteit en andere meer gevestigde empirische methoden door multimodale analyse een plaats te geven binnen de netwerk-verkenningsmethode zoals uitgewerkt in hoofdstuk 5.

Deze analyse brengt verdere nuances aan in het beschrijven van platformpraktijken als connectief programmeren door erop te wijzen dat sociale praktijken, net als platformen, niet stabiel, vast en uniform, maar juist divers zijn, variëren en fluctueren. Ik lever een methodologische bijdrage door te onderzoeken hoe het platform kan worden afgesteld voor onderzoek naar nieuws. Daarbij reik ik technieken aan waarmee onderzoekers de analytische capaciteiten van het platform kunnen benutten, en tegelijkertijd de logica ervan kunnen ombuigen en afstellen naar hun eigen onderzoeksvragen- en interesses.

Ik onderzoek hoe datering van gebruik en vastgelegde gegevens van samenwerking en waardering kunnen worden gebruikt voor onderzoek naar de wezenskenmerken van platform-activiteit. Deze gegevens illustreren de vluchtigheid van programmeerwerk en de waardering voor verschillende onderdelen van journalistieke codes op GitHub. Ik toon aan dat specifieke platformwaarden zoals de updatecultuur een spanningsveld veroorzaken met journalistieke programmeerwaarden. Ook laat ik zien dat het vooral het programmeur-publiek is dat vorm geeft aan de waardering van journalistieke productie op het platform. Deze beschrijving nuanceert het beeld van platformpraktijken als connective coding door te laten zien dat deze praktijken divers, variërend en fluctuerend zijn. Ik zal een methodologisch instrumentarium aanreiken waarmee onderzoekers kunnen recht doen aan de specifieke kenmerken van de journalistieke platformen.

Hoofdstuk 5 vertrekt vanuit de notie van fake news. We analyseren webtrackers als news devices en bestuderen de problematische relatie met de verdienmodellen van digitale journalistieke contentproductie. Ik maak daarbij gebruik van tracking instrumenten om na te gaan hoe audience economics verbonden zijn met de commercialisering van journalistiek en virale junk

praktijken.

Ik analyseer webtrackers als onderdeel van de post-exposure audience marketplace (Napoli, 2011), waar de advertentie-gestuurde digitale contentproductie zich steeds dieper nestelt. Om digital methods te hanteren in het onderzoek naar deze commercialisering extraheer ik de trackingsmechanismen van derde partijen die ingesloten zitten in een aantal pagina's van mainstream- en ook van junknews websites. Ik zal nagaan hoe deze onderliggende instrumenten de publieksmarkt beïnvloeden.

Mijn analyse zal daardoor ook verbonden worden met juridische elementen, zoals de Algemene verordening gegevensbescherming (AVG) waarmee de EU de praktijken op de publieksmarkt tracht te reguleren.

Om aan te tonen hoe sterk de tracking devices verbonden zijn met de culturele betekenisproductie, zal ik in kaart brengen welke vormen van instrumenten gehanteerd worden. Zo zijn er geprofessionaliseerde configuraties waarbij gespecialiseerde diensten middels een groot aantal tussenpersonen tracking intensief en op maat mogelijk maken. Daarnaast zijn er ook minder complexe configuraties toegespitst voor sociale media en advertentienetwerken.

Voor onderzoek binnen journalism studies en voor nieuws is het blootleggen van die tracking practices belangrijk. Ik zal aantonen welke methodologische moeilijkheden overwonnen moeten worden bij gebruik van trackingdetectie, die gelieerd zijn met technische aspecten van onderzoek enerzijds en met de veranderlijkheid en instabiliteit van het onderzoeksobject anderzijds.

Ik sluit dit proefschrift af met de belangrijkste conclusies van de verschillende onderzoeksonderdelen en reflecteer op de mogelijkheden, uitdagingen en implicaties ervan voor toekomstig onderzoek naar digital news en digital journalism.

Ik reflecteer op de bijdrage die de news devices benadering kan bieden binnen journalism studies en de drie case studies als empirische vertaling ervan. Ik

bespreek hoe de news devices approach zich verhoudt tot andere benaderingen over digital journalism en ik vergelijk haar mogelijkheden met die van social media studies, critical research en computational approaches.

De conceptuele en methodologische opvattingen die de news devices approach sturen hebben invloed op de onderzoeksvragen voor toekomstig onderzoek en openen deuren voor het aanpakken van blinde vlekken die nog in de huidige stand van onderzoek aan te duiden zijn.

De news devices benadering levert ook een aantal opportuniteiten als vertrekpunt voor dialoog met andere onderzoeksdisciplines.

Het blijft een uitdaging voor de verdere vormgeving van onderzoek naar nieuws en journalism studies waarbij ook journalisten als belangrijkste stakeholders binnen nieuwsproductie moeten en kunnen betrokken worden.

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List of Publications and Presentations

Based on This Doctoral Research

Publications

- Gray, J., **Bounegru, L.**, & Venturini, T. (forthcoming). 'Fake News' as Infrastructural Uncanny. *New Media & Society*.
- Gray, J., & **Bounegru, L.** (2019). What a difference a dataset makes? Data journalism and/as data activism. In J. Evans, S. Ruane, & H. Southall (Eds.), *Data in Society: Challenging Statistics in an Age of Globalisation*. Bristol: The Policy Press. <https://doi.org/10.5281/zenodo.1415450>
- Bounegru, L.**, Gray, J., Venturini, T., & Mauri, M. (2018). *A Field Guide to Fake News' and Other Information Disorders*. Amsterdam: Public Data Lab. Retrieved from <https://papers.ssrn.com/abstract=3097666>
- Gray, J., Gerlitz, C., & **Bounegru, L.** (2018). Data Infrastructure Literacy. *Big Data & Society*, 5(2), 1–13. <https://doi.org/10.1177/2053951718786316>
- Venturini, T., Jacomy, M., **Bounegru, L.**, & Gray, J. (2018). Visual Network Exploration for Data Journalists. In S. A. I. Eldridge & B. Franklin (Eds.), *The Routledge Handbook to Developments in Digital Journalism Studies*. London: Routledge.
- Venturini, T., **Bounegru, L.**, Gray, J., & Rogers, R. (2018). A reality check(list) for digital methods. *New Media & Society*, 1–23. <https://doi.org/10.1177/1461444818769236>
- Bounegru, L.**, Venturini, T., Gray, J., & Jacomy, M. (2017). Narrating Networks: Exploring the Affordances of Networks as Storytelling Devices in Journalism. *Digital Journalism*, 5(6), 699–730. <https://doi.org/10.1080/21670811.2016.1186497>
- Venturini, T., **Bounegru, L.**, Jacomy, M., & Gray, J. (2017). How to Tell Stories with Networks: Exploring the Narrative Affordances of Graphs with the Iliad. In M. T. Schäfer & K. van Es (Eds.), *The Datafied Society: Studying Culture through Data*. Amsterdam: Amsterdam University Press.

- Gray, J., **Bounegru, L.**, Milan, S., & Ciuccarelli, P. (2016). Ways of Seeing Data: Towards a Critical Literacy for Data Visualizations as Research Objects and Research Devices. In S. Kubitschko & A. Kaun (Eds.), *Innovative Methods in Media and Communication Research* (pp. 290–325). London: Palgrave Macmillan.
- Gray, J., Lämmerhirt, D., & Bounegru, L. (2016). Changing What Counts: How Can Citizen-Generated and Civil Society Data be used as an Advocacy Tool to Change Official Data Collection?.

Presentations

- The Infrastructural Uncanny and the Social Life of Junk Viral News Online.*
Presentation at ‘Shadow Economies of the Internet’ workshop, Stockholm University, Sweden, 20 September 2018.
- The Social Life of “Fake News” Online.* Guest lecture and workshop at the University of Warwick, U.K., 9 May 2018.
- Some Provocations About “Fake News”.* Invited lecture at ‘Inventive Methods for Media Research’ lecture series, University of Siegen, Germany, 16 January 2018.
- Following Concerning Facts Online: The Case of False Viral News and Other Information Disorders.* Keynote at the Digital Methods Winter School 2018, University of Amsterdam, Netherlands, 8 January 2018.
- Fake News in Digital Culture.* Invited talk at the Department of Digital Humanities, King’s College London, 11 October 2017.
- Fake News in Digital Culture.* Invited talk at the Institute for Policy Research symposium on Politics, Fake News and the Post-Truth Era, University of Bath, 14 September 2017.
- A Field Guide to Fake News.* Launch event panel at the International Journalism Festival, Perugia, Italy, 7 April 2017 (with Jonathan Gray, Michele Mauri, Angeles Briones, Claire Wardle and Craig Silverman).
- Fake News, Algorithmic Accountability and the Role of Data Journalism in the Post-Truth Era.* Invited talk at the workshop ‘How Can Public Interest Journalism Hold Algorithms to Account?’, University of Cambridge, 23 March

2017 (with Jonathan Gray).

What Can Data Journalists and Digital Humanists Learn from Each Other? Invited talk at the Digital Humanities + Data Journalism Symposium, University of Miami, US, 30 September 2016 (with Jonathan Gray).

Data Journalism and the Remaking of Data Infrastructures. Invited talk at the Evidence and the Politics of Policymaking: Where Next? Symposium, Institute for Policy Research and Centre for Development Studies, University of Bath, UK, 14 September 2016.

Data Infrastructure Literacy: Reshaping Practices of Measurement, Monitoring and Evidence. Conference paper at 4S/EASST Conference Barcelona 2016, Spain, 2 September 2016 (with Jonathan Gray and Carolin Gerlitz).

Doing Digital Methods. Some Recent Highlights from Winter and Summer Schools. Invited talk at the Digital Methods Summer School, Digital Methods Initiative, University of Amsterdam, Netherlands, 27 June 2016.

Ways of Studying, Using and Intervening in Data Infrastructures. Invited seminar at Sciences Po Paris médialab, France, 19 April 2016 (with Jonathan Gray and Carolin Gerlitz).

The Rise of Data Journalism: The Making of Journalistic Knowledge through Quantification. Invited lecture at Sciences Po Paris, France, 5 April 2016 (with Jonathan Gray).

Ways of Seeing Data: Towards a Critical Literacy for Data Visualisations as Research Objects and Research Devices. Paper at the Digital Methods Winter School Conference, University of Amsterdam, Netherlands, 14 January 2016 (with Jonathan Gray).

Towards a Literacy for Data Infrastructures. Paper at the Digital Methods Winter School Conference, University of Amsterdam, Netherlands, 14 January 2016 (with Jonathan Gray and Carolin Gerlitz).

What Does a Good Digital Methods Project Look Like? Some Highlights from DMI Winter and Summer School 2015. Invited talk at the Digital Methods Winter School 2016, University of Amsterdam, Netherlands, 11 January 2016.

From Telling Stories with Data to Telling Stories with Data Infrastructures: Repurposing Digital Methods and the Data Sprint for Data Journalism. Invited lecture at the University of Amsterdam, Netherlands, 7 January 2016.

Doing Social and Political Research in a Digital Age: An Introduction to Digital Methods.

Invited lecture at the University of Ghent, Belgium, 4 December 2015.

Doing Social and Political Research in a Digital Age: An Introduction to Digital

Methods. Invited lecture and seminar at the National Centre of Competence in Research: Challenges to Democracy in the 21st Century, University of Zurich, Switzerland, 5-6 November 2015.

Redistributing Journalism: Journalism as a Data Public and the Politics of Quantification in the Newsroom. Paper given at the Data Power Conference, University of Sheffield, UK, 22 June 2015.

Storytelling with Data Visualisation: An Introduction. Invited workshop given at the Amsterdam School of Communication Research (ASCoR), University of Amsterdam, Netherlands, 10 June 2015 (with Jonathan Gray).

Using Data for Science Journalism. Invited talk and workshop at the International School of Science Journalism, Erice, Italy, 10 May 2015 (with Jonathan Gray).

Follow the Networks: Open Data and Digital Methods for Journalism. Invited lecture at University of California Berkeley, US, 20 April 2015 (with Jonathan Gray).

Improving the Coverage of Complex Issues with Data Journalism and Digital Methods. Invited talk at the BBC Data Day, London, UK, 12 November 2014.

An Epistemological Experiment: Issue Mapping, Data Journalism and the Public Understanding of Complex Issues. Invited lecture at the Department of Media and Culture Studies, Utrecht University, Netherlands, 27 October 2014 (with Jonathan Gray).

What Actor-Network Theory (ANT) and Digital Methods Can Do for Data Journalism Research and Practice. Invited lecture at Ghent University, Belgium, 21 October 2014.

Mapping Issues with the Web: An Introduction to Digital Methods. Invited talk at Columbia University, New York, US, 23 September 2014 (with Jonathan Gray).