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The Relevance of Technology to Information Verification: Insights from Norwegian Journalism During a National Election

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ABSTRACT

Growing concerns about disinformation have led to the development of new digital tools and systems designed for journalists' verification and fact-checking needs. Despite these technological developments, research has demonstrated that emerging technologies are not utilised as often and are not as highly valued as industry narratives suggest. There are indications that the typical journalist values traditional skills such as writing and interviewing higher than digital technology skills and that many journalists do not consider the new tools to be very useful in their everyday work. This article takes on a sociotechnical approach to study the interplay between journalists, technology, organisational and professional routines. Specifically, we examine journalists' use of verification technologies to detect disinformation during an election period. Our findings show a discrepancy between the alleged potential of new technologies and the everyday practices of newswork and fact-checking – also in the digitally advanced Norwegian media industry. We found tensions between established routines and cultures in the newsroom and the push for the renewal of journalistic methods which can be sorted under two headings: strategy vs. practice and proximity vs. distance to the beat and sources.

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Introduction

Online distribution of mis- and disinformation has emerged as a global problem that can challenge the credibility of the news media, affect elections, and harm democracy (Bradshaw and Howard 2019; Marwick and Lewis 2017; Wardle and Derakhshan 2017). Cases where misleading information is spread through legacy news media weaken the general trust in journalism and enhance journalists' sense of responsibility to verify facts and sources (Ireton and Posetti 2018; Marwick and Lewis 2017). Growing concerns about the information disorder have led to the development of new digital tools and systems designed for journalists' fact-checking needs, but often developed detached from the media industry

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and later internalised by actors in the journalistic field (Lindblom, Lindell, and Gidlund 2022; Westlund et al. 2022; Wu, Tandoc, and Salmon 2019). Some of the tools are designed to completely automate the verification process of facts and sources (Graves 2018).

Previous research has demonstrated that emerging technologies are not utilised as often and are not as highly valued as industry narratives suggest (Spyridou et al. 2013). There are indications that the typical journalist values traditional skills such as writing and interviewing higher than digital technology skills and that many journalists do not consider the new tools to be very useful in their everyday work (Min and Fink 2021; Posetti (n.d.) 2018). This suggests a gap between the developments of new technologies and the everyday practices of newswork. Work culture, time pressure, and newsroom autonomy are among the recurring explanatory factors for this tension, as well as journalists' struggles to achieve the necessary new skills (Boczkowski 2004; Min and Fink 2021; Steensen 2009; 2011). Different studies indicate there could be a fatigue in the industry toward new tools and technologies and a possible shift among editorial leaders to avoid unfocused pursuit of innovation (Posetti (n.d.) 2018; Zelizer 2019). However, previous studies have primarily looked at the use of technology in newsrooms from an innovation perspective - how the media industry manages the digital transformation - while this paper focuses on newsrooms' use of technology in relation to election disinformation. Developments of tools and technologies have been instrumental in the fight against disinformation (Westlund et al. 2022), yet little is known about the degrees to which the industry's innovation fatigue also applies to such verification tools and technologies. This paper addresses this research gap, as it analyses uses and assessments of the relevance of verification technologies in different newsrooms in Norway in a time of information disorder.

The study was conducted during the Norwegian parliamentary election in September, 2021. Election periods are particularly vulnerable to foreign information operations and the possible spread of disinformation was already on the government's agenda. The main focus of our study was journalists' verification of information and news related to the election, and what tools they used to identify any attempts of mis- or disinformation. Norway has high scores on average digital skills and the Norwegian news industry has undergone a relatively soft transition from an analogue to a digital business model (Olsen, Kalsnes, and Barland 2021), which makes it likely that Norwegian journalists have the willingness, know-how and resources necessary to adopt new technology to their practice if they find them relevant. This backdrop makes Norwegian newsrooms' use of technology a particularly interesting case to study.

The article starts by exploring how sociotechnical perspectives have been integrated into studies of newsrooms' adoption or resistance to new technologies. Subsequently, the article reviews literature in two areas: (1) sociotechnical studies of the interplay between humans, technology and organisations and (2) resistance and constraints to technology adoption. We then present the context of the study – the use of technology in Norwegian newsrooms – before discussing methods and findings.

Journalism as a Sociotechnical Practice

Journalism has been called a “discipline of verification” (Kovach and Rosenstiel 2001) where a central part of the job is to figure out what is true and important about a story. Verification of facts has been deemed so central to the journalists' occupation

that it has been called part of journalists’ “strategic ritual” (Tuchman 1972) which helps journalists to define facts. In the Scandinavian countries the practice of source criticism, a methodology used to critically evaluate sources and the information they convey, is a central part of journalistic education and practice (Steensen et al. 2022). While journalists use different kinds of strategies for verification, such as seeking out purported facts and testing their veracity and coherence (Shapiro 2010), technology has always been part of journalists’ toolbox. Journalism has relied on technology of different kinds to check information, craft its messages and share them with the public (Zelizer 2019), ranging from notebooks and wires to cameras and smartphones. Although journalism has always been affected by technology (Pavlik, 2001), the digital turn has brought the field into a state of flux. Rapid and dramatic structural changes have taken place within journalism, affecting it as a practice, as a product and as a profession (Spyridou et al. 2013).

In recent years we have seen an even greater emphasis on verification. The changes within the media industry have led to changes in the practices of verification and triggered new forms of fact-checking (Westlund & Ekstrøm, 2019, 83). The necessity of evidence goes hand in hand with the growing dissemination of misinformation and disinformation (Reich and Barnoy 2023, 23).

Journalists’ adoption and non-use of technology have typically been studied along the lines of practice theory (Powers and Vera-Zambrano 2018), actor-network theory (Spyridou et al. 2013), or a social constructivist approach (Steensen 2009). Steensen et al. (2019) found that sociotechnical theories like actor-network theory (ANT) have been influential in studies of digital journalism, since they emphasise not only the mutual shaping of journalism and technology but also juxtapose human, technological and material actors and actants as equally important to this mutual shaping. It has been acknowledged for many years that journalists are shaped both by factors intrinsic and extrinsic to the news organisations, such as, respectively, organisational characteristics and interactions between newswriters, but also technology, social institutions, audiences and advertisers (Godler and Reich 2017; Shoemaker and Reese 2011). By including social, political, cultural, epistemological and economic discourses, a sociotechnical perspective shies away from a deterministic focus on technology in isolation. Lewis and Westlund (2015) argue that the “sociotechnical emphasis acknowledges the extent to which contemporary journalism is becoming interconnected with technological tools, processes, and ways of thinking as the new organising logics of media work” (2015, 21). The approach is developed to better reflect the interplay of humans and technology, as well as the interplay of editorial, business, and technology in news organisations (2015, 19).

To describe journalists’ professional norms and practises the term journalistic culture has been suggested by Hanitzsch et al. (2011). Journalistic culture means that the field of journalism is being constituted and reaffirmed by a set of culturally negotiated professional values and conventions that are incorporated and often taken for granted by individual journalists, and the term has been defined as “a particular set of ideas and practices by which journalists legitimate their role in society and render their work meaningful” (Hanitzsch 2007, 369). Similarly, studies of news routines and convention within journalism demonstrate that routines have produced predictable organisational behaviour and often standardised content (Lindner 2017). News routines help journalists deliver a consistent product within demands of news selection, sourcing, deadlines, limited resources, and an inconsistent supply of sensational news stories (Reich 2009).

Routines, such as the division of newsgathering labour into “beats” (Fishman 1988; Magin and Maurer 2019), help to structure the daily work of journalists, as well as what tools and technologies they use. However, routines take time to establish and can be hard to transform or replace, thereby creating a certain degree of resistance to change within newswork, which can lead to tensions between strategy and practice in the newsrooms. Research has also demonstrated that new technology seldom will have a consistent impact across a news organisation due to different adaptation in an organisation (Bunce, Wright, and Scott 2018). This can have consequences to the degrees to which new technologies and working methods are perceived as relevant to the practice of journalists, even if there is a push for technological development to solve an emerging problem, like the threats of disinformation and a consequent need for new approaches to source and information verification (Steensen et al. 2022). Thus, we ask (RQ1): *To what degree do Norwegian journalists use verification technologies?*

Resistance and Constraints to Technology Adoption

Empirical studies of technology adoption in newsrooms have stressed different agents and conditions influencing the degrees to which new technologies are embedded (or not) into journalistic practices, ranging from structural factors (Boczkowski 2004), skills (Brannon 2008), norms within the profession (Paulussen and Ugille 2015), and time pressure (Brandtzaeg et al. 2016). Aspects related to professional and organisational culture in general and the routines of newswork in particular are often used to explain reluctance to change and implementation of new technology. Or as Zelizer has described it, “much about journalism remains stable across adaptive technologies. But the attention given to stability fades when primary investments continue to focus on the latest technological revolution” (Zelizer 2019, 346). It can be easy to lose track of slower changing elements of journalism in light of new technological devices. Additionally, journalism is perceived as a social phenomenon rooted in and shaped by professional, organisational and economic factors (Fenton 2010), where technology is not the only agent for change.

In this study, we are interested in examining journalists’ use of technology, and specifically journalists’ use of tools and technologies to verify information, such as the authenticity of the source, the information and the context. Verification is among the most established elements of journalism (Kovach and Rosenstiel 2001; Shapiro et al. 2016;). Earlier research shows that even across cultural and socio-demographic lines, journalists tend to share the professional value of verification and truth-telling (Shapiro et al. 2013; Hanitzsch et al. 2019).

To fact-check and verify information requires a wide range of skills by journalists, among them the use of technology or data skills, as argued by Himm-Kadakas and Ojamets (2022), who also find that fact-checking skills and competencies evolve with technological development (2022, 871). Kovach and Rosenstiel (2001) describe the discipline of verification as the essence of journalism, a process that rests on three core concepts – transparency, humility, and originality. These principles are closely intertwined with culture and routines in the newsroom, regardless of whether the journalist uses conventional or advanced tools and methods for fact-checking.

Time pressure is often raised as an explanation for why some journalists avoid using technological tools in the verification process (Thomson et al. 2022). Brandtzaeg et al.

(2016) interviewed 24 journalists from major European news organisations and identified tensions between verification processes and the demands for fast-paced publishing. They argued that journalists would need “efficient and easy-to-use” tools to deal with such demands (2016, 323). In 2017, a global quantitative study performed by the International Centre for Journalists (ICFJ) found that 11 percent of those surveyed used social media verification tools (Owen 2017). The ICFJ surveyed over 2,700 journalists and newsroom managers in over 130 countries. Two years later, in 2019, 25 percent of journalists said they used verification tools at least weekly, and more than one-third of news managers reported the same (Owens 2019). Time pressure can affect which verification methods are used, but also which statements to verify. Information and statements from sources familiar to the journalists are perceived as less important to verify, the same applies to authoritative sources. Proximity between journalists and sources – which is common within certain beats and within smaller communities – reduces the probability of cross-verification (Godler and Reich 2017; Himma-Kadakas and Ojamets 2022).

Visual, multimodal and data-driven disinformation is perceived as more credible and harder to detect than text (Hameleers 2022; Kwanda and Lin 2020) and researchers have stressed that “journalists - regardless of their platform - need to become familiar with the practical features of digital tools in order to use them” (Himma-Kadakas and Ojamets 2022, 883). This has been portrayed as particularly relevant during election periods, which in recent years have been vulnerable to disinformation and other kinds of information manipulation (López-García et al, 2021). Our second research question (RQ2) therefore asks: *What is the perceived relevance of verification technologies to detect disinformation when Norwegian journalists assess sources and information during an election period?*

The Norwegian Case

Norwegian newsrooms’ use of technology is a particular interesting case to study for three main reasons. Norway has very active digital media users, social media is in high use daily (Facebook, 73 percent, YouTube, 55 percent, Snapchat, 50 percent), and 43 percent use a smartphone daily to check news (Newman et al. 2022). Secondly, Norway is called a “digital savvy market” with innovations in content and business models (Moe 2022). Digitalisation and changing media habits have challenged the traditional business model of news, particularly for local news outlets, but Norwegian media companies have had a relatively soft and successful transition from print to digital media business (Olsen, Kalsnes, and Barland 2021). Digital subscriptions for news (or so-called paywalls) had a breakthrough in Norway in 2015 and improved revenues for Norwegian news companies (ibid). Norway remains the country with the highest number of the population worldwide willing to pay for online news, 41 percent (Newman et al. 2022). Thirdly, gradual shifts of competence have occurred in newsrooms over the past decades. In a study of job advertisement for journalists in Norwegian media outlets during 1987-2017, several shifts were visible: requirements shifted from analogue to digital competence, from practical to formal education, and from knowing how to drive a car to knowing how to write code (Steensen and Kalsnes 2020).

At the same time, the threat from foreign information operations and the spread of disinformation are given more attention in the Norwegian media sphere (Kalsnes 2019).

Russian interference in the 2016 US election as well as other attempts to interfere in national elections and politics around the globe raised awareness of the problematic role of disinformation in society ((Mueller, 2019; Benkler, Faris, and Roberts 2018; Woolley, & Howard, 2017). The Norwegian government released a strategy in 2019 to increase resilience and reduce foreign interference in elections (SMK 2019), and the strategy was updated in 2021 (SMK 2021). During the Norwegian local election in 2019, no clear signs of foreign interference was found (Grøtan et al. 2019; Karlsen 2021), nor in the 2021 national election, according to a report from the Norwegian Defense Research Establishment (Sivertsen et al., 2022). However, as the newsrooms prepared to cover the national election in 2021, attempts of hacking the parliament Stortinget and parliamentarians were revealed less than half a year before the election (Gausen et al. 2021). How the newsrooms could detect foreign interference, particularly through digital technologies, was also the topic of a meeting for journalists covering the parliament before the election (Hoel et al. 2021).

Mixed Methodological Approach

To answer the research questions, we utilised a mixed methods approach combining quantitative survey data of Norwegian journalists with qualitative observation and interview data from three Norwegian newsrooms. This research design allowed us to not only provide answers to whether Norwegian journalists use different technologies for their source and information assessment practices, but also why technologies matter or not in these practices.

Survey of Norwegian Journalists

A survey was distributed to all members of the Norwegian union of journalists (NJ) and the Norwegian Editors Association (NR) (total population = 6420) in May/June 2021. This survey, which is part of a larger research project (the Worlds of Journalism Study), contained questions on role perceptions, safety, editorial freedom, influences on news production, and the impact of technology, among other topics. The survey was web-based and distributed via e-mail sent out by NJ and NR. The email invitations contained unique links to the survey, which made it possible to send reminders. E-mail addresses or any other personally identifying information from the survey respondents were not collected, and the survey was approved by our university's data protection officer. The survey generated 1237 responses, which equals a response rate of 19 per cent. However, 310 of the responses were incomplete, meaning that final N in this article is 919. Even though this lowers the response rate, there are no significant biases in the responses compared to the total population.

For the purpose of the present study, the following question with five sub-questions was added to the survey:

How Often do you use the Following Technologies in Your Work as a Journalist?

- technology to check the authenticity of an image (like reverse image search)
- technology to check the authenticity of a video or audio file (like InVID or YouTube Data Viewer)

- technology to check the authenticity of social media accounts (like Facebook graph or Socialblade)
- technology to check the authenticity of a web site (like Whois or Norid)
- *other technologies (beyond regular web search) you use to verify sources and information. Please specify.*

Answers to the first four sub-questions were provided on a Likter's scale from 1 to 5 (1 = Always, 2 = Often, 3 = Sometimes, 4 = Rarely, 5 = Never, in addition to a "I don't know" option). The last question was open-ended, implying that respondents could write anything they wanted in a text field. Here, we were interested in finding out what the respondents would identify as other relevant technologies in relation to verification. A definition of "technology" was purposefully left out of the questions, because we wanted to find out what the respondents themselves identified as technologies they perceived as relevant. We analysed the answers according to the proficiency levels of digital literacy as defined by the Digital Competence Framework for Citizen (DigComp) developed by the European Commission (Vuorikari, Kluzer, and Punie 2022). We classified technologies that fall under the "Foundation" or "Intermediate" proficiency levels of digital literacy as "ordinary tools", meaning that these are technologies that most people have the skills and know-how to use. Such technologies include smartphones, Google search, messaging and social media services, e-mail, etc. Technologies that fall under the "Advanced" or "Highly specialised" digital literacy proficiency levels of the DigComp were classified as "advanced" or "specialised" technologies.

Observation and Interviews

The authors were present in three newsrooms during August and September 2021 to observe journalists' practices with source assessment and information verification in relation to the 2021 election in Norway. The three newsrooms were selected to gain varied insight into the working methods of journalists engaged with news and politics, from newsrooms that differed in size, location and mission – including one national (NRK), one regional (Nordlys) and one fact-checker organisation (Faktisk.no). NRK is the main public broadcaster with an important role in the Norwegian election coverage, where we considered it essential to gain access. Nordlys is the main regional newspaper in the north of Norway, a part of the country which traditionally has closer ties to Russia than southern Norway, thus potentially more exposed to Russian disinformation. Faktisk.no is the only fact-checking organisation in Norway, owned by six different media companies and established in 2017. [Table 1](#) displays detailed information about the three news media companies.

In NRK our observation period ran from the 5th of August to the 14th of September 2021. The election was held on September the 13th. We chose to be present at NRK's headquarters in Oslo where we attended several physical and digital meetings. Due to corona restrictions, the daily morning meetings from the head office were held online. Most of our time in NRK was spent at the "news floor". This is the heart of the news department where the online edition is constantly updated by staff from NRK Direct and journalists working shifts from the regular news, politics, and foreign news departments. One of the obstacles we experienced at NRK was the restricted access to the

Table 1. Selected media organisations: number of employees, mission, ownership, audience and platform use.

News organisations	Employees	Mission	Ownership	Audience	Platforms
Nordlys	40 (adm. + editorial)	To be an honest advocate for ordinary people	Amedia (foundation-owned media group)	68.708 (daily)	Digital + Paper
NRK	3300 (adm. + editorial)	To offer public service broadcasting in the form of radio, TV and other media platforms to the entire Norwegian population.	Politically independent public broadcaster	1 529 169 (daily)	Digital, TV, Radio
Faktisk	10 (adm. + editorial)	To run an independent newsroom for fact-checking the social debate and public discourse in Norway.	Non-profit, independent organisation, owned by Norwegian media houses and groups.	Data not available	Digital

Sources: Amedia.no, Nordlys.no, Nrk.no, Faktisk.no, MBL (Medietall.no, 2023-figures).

group of journalists that worked solely with political affairs. We approached the manager in various ways but ended up with just being able to attend two digital meetings with the group, and follow their work when they were doing shifts at the “news floor”. This limited our opportunity to observe the practice of fact-checking and source criticism in the run-up to the election. Another obstacle we met was our limited access to NRK’s digital communication tools. Most of the internal communication between management and journalists, and journalists cooperating with each other, took place on Slack, WorkChat and Workplace. We could follow the open communication in the newsroom, but could only occasionally (when we sat down with one of the journalists) see the digital communication between them.

In Nordlys, one of the authors was present from the 30th of August to the 3rd of September. The researcher was given full access to the journalistic process, including all meetings. Throughout the week the researcher observed the daily routines in Nordlys, attended meetings, observed journalists while working, hung around the coffee machine, and sat down for lunch with the editorial staff as often as possible. The journalists were open-minded, they did not mind sharing thoughts and routines regarding verification processes and showed the researcher their planning tool Trello and upon request, the internal communication on Workplace. Situated at the editorial desk in the newsroom, the researcher was able to observe the editing and publication process both at the print and the online edition of Nordlys.

In Faktisk.no we had two evenings of observation, 31. August and 10. September. During these evenings, Faktisk performed live fact-checking of political debates between party leaders prior to the election. Two of the authors were present during the first debate. For the second debate one of the authors was present in the newsroom. We were granted full access to the Faktisk newsroom and digital communication tools, implying that we could take part in preparation meetings and everything the fact-checkers did during the operations of the newsroom before, during and after the debates. The newsroom of Faktisk is a quite small, open-plan office space, where seven to nine fact-checkers were present both evenings, all of them working on the live fact-checking. All fact-checkers were very open and we did not experience any attempts at holding information back from us.

The third method used to gather data for this article is qualitative interviews. To further explore our findings from observations in the newsrooms at Nordlys, NRK, and Faktisk, we used data from nine semi-structured interviews with journalists, managers, and editors in these three newsrooms during the Fall 2021. The informants were selected based on their type of work and beat, we targeted journalists and managers who covered political and societal matters. The interview guide was semi-structured with room for follow-up questions and a sequence of Grand Tour questions (Spradley 1979) where the informant described a specific work process. Seven interviews were conducted at the informants' workplace, while two were conducted digitally. Only the interviewer and the informant were present. The interviews are part of a larger research project with interview codes running from 1 - 26.

The authors of this paper shared access to the same OneNote notebook system during fieldwork, where observation notes were gathered consecutively. Most of the notes fell under the category descriptive field notes, simple descriptions of what we saw during fieldwork. The notes and the interview transcripts were imported into Nvivo, a software program suitable for coding and analysing unstructured text. The research was approved by the Norwegian Agency for Shared Services in Education and Research (SIKT). All informants gave their informed consent to participate in the study.

Findings and Discussion

Our results support the suggestion of a gap between employment of new technologies and the everyday practices of newswork and fact-checking – also in the digitally advanced Norwegian media industry. We found discrepancies both in the actual use of verification tools (RQ1) and in the journalists' perceived relevance of verification technologies to detect disinformation during an election period (RQ2). The findings will be presented and discussed thematically, starting with survey results, before proceeding to data from observations and interviews in the three newsrooms which are sorted under the two tensions: strategy vs. practice and proximity vs. distance to the beat and sources.

Norwegian Journalists' use of Verification Technologies

The survey data shows that using technologies for assessing the authenticity of images, videos, audio files, social media accounts, and web sites is not a daily routine for Norwegian journalists. There is, however, one notable exception, namely that technologies for image verification are used more often than text verification tools. 13 per cent use image verification technologies always or often, while almost 40 per cent use it sometimes, often or always (Table 2), followed by technologies for web, SoMe and video/audio verification, which is least common. The share of respondents using the other technologies sometimes, often or always is between 13,6 percent (video/audio) and 22,1 percent (Web sites).

These numbers seem quite similar to the International Centre for Journalists survey of journalists' use of social media verification tools (ICFJ, 2019), but comparisons are difficult to make because of differences in question formulations.

The respondents were also asked if they used any other technologies to verify sources and information, and if so, which one. 134 journalists (15 percent) provided answers to this open-ended question. These answers were inductively categorised, as can be seen in Figure 1.

Table 2. Norwegian journalists' use of technologies to check the authenticity of images, video and audio files, social media accounts, and web sites. N = 919 (1-2 responses missing for two of the questions).

How often do you use the following technologies in your work as a journalist?	Technologies to check the authenticity of:							
	Images		Video/Audio		SoMe accounts		Web sites	
	No	%	No	%	No	%	No	%
Always	6	0,7%	5	0,5%	4	0,4%	7	0,8%
Often	112	12,2%	30	3,3%	40	4,4%	48	5,2%
Sometimes	245	26,7%	90	9,8%	112	12,2%	148	16,1%
Rarely	250	27,2%	244	26,6%	243	26,5%	228	24,8%
Never	288	31,4%	519	56,5%	489	53,3%	456	49,6%
Don't know	17	1,9%	31	3,4%	29	3,2%	32	3,5%
Total	918	100%	919	100%	917	100%	919	100%

The most frequently mentioned technologies were access to a wide range of digital archives and databases. However, about half of the replies mention what we categorised as “ordinary tools” (in accordance with the DigiComp framework of digital literacy proficiency levels), like for instance smartphones, Google search, e-mail, and messaging services, and as “analogue, traditional reporting activities”, meaning activities like talking to people, reading books or reports, contact with personal networks, etc.

15 percent of the replies listed some kind of special tool or advanced search technique, reflecting the “advanced” or “highly specialised” digital literacy proficiency levels of the DigComp. The Special tools category includes technologies like CrowdTangle (A tool owned by Meta to monitor and analyse public content on Facebook, Instagram and

Other technologies used by Norwegian journalists to verify information

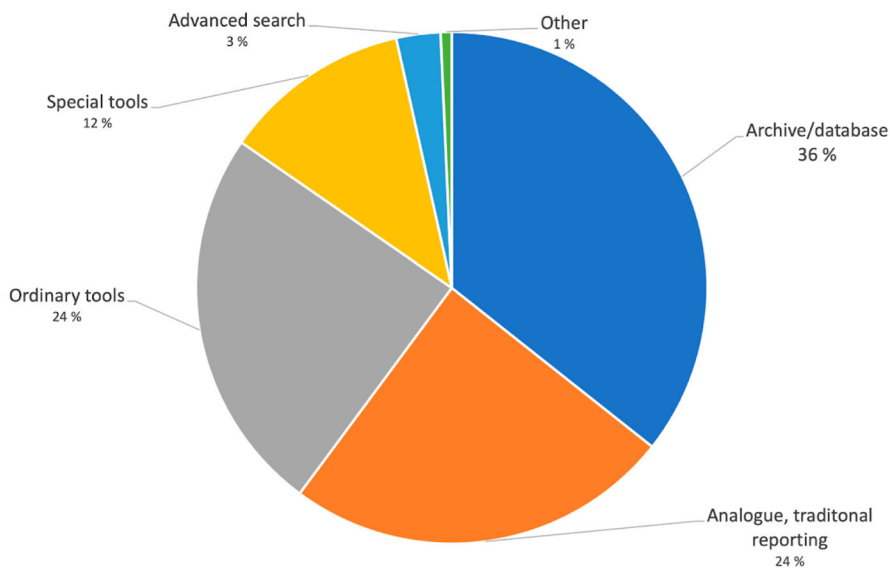


Figure 1. Types of other technologies than image/video/audio/SoMe/website verification technologies used by Norwegian journalists to verify information and sources (N = 134).

Reddit), OSINT tools (Open Source Intelligence), and specific technologies like Flight Radar, Marine Traffic, and various map services.

To see if some groups of journalists used the verification technologies significantly more often than others, we cross tabulated the responses with a few background variables, like: age, gender, higher education (university degree or not) and work experience.

Few of these variables played a significant role ($p > 0,05$) in explaining use of verification technologies. However, male journalists are significantly more likely to use web site verification technologies than their female colleagues. And newly hired (work experience < 5 years), young (< 35 years) journalists are significantly more likely to use image verification technologies than their older, more experienced colleagues. The finding is supported by previous studies showing that tech skills tend to be negatively correlated with age (Küng 2017).

Observations and interviews conducted at Nordlys, NRK and Faktisk support the survey findings showing that advanced verification technologies are not often used by Norwegian journalists. In the everyday practices of news work and fact-checking, journalists at these newsrooms were prone to use what we above labelled ordinary tools such as e-mail, Google applications, Slack, and smartphones, as well as content management software, digital archives, and databases to perform their activities.

We did not observe the use of advanced verification tools while present in the news rooms at NRK or Nordlys. However, the interviews showed variations in the use of advanced tools within the same newsroom, exemplified by one of the journalists in Nordlys.

I use a lot of access portals and online searches, of course. I have archive solutions so that I can go back, WayBack and Archives. I've also tried my hand at some digital programming courses, not quite there yet, but working on it. (*Interview 02*)

This journalist had attended a course in advanced search techniques with the journalist union. She mentioned daily use of tools such as WayBack Machine and Reverse image Search, as well as more ordinary tools, when describing her verification methods. In contrast, one of her colleagues mentioned only "ordinary tools" (smartphone and pc) while asked about the use of advanced verification tools.

The fact-checkers at Faktisk had internalised more advanced technologies, like Crowd-Tangle and Storyboard (a tool developed by a Norwegian company to monitor stories trending on social media). They also relied heavily on access to databases with statistical data as a key ingredient to the decisions they would make on what topics and potential claims to fact-check. And they utilised a few uniquely designed advanced tools directed towards identifying claims that could be fact-checked.

To further explore some possible reasons for why advanced verification technologies were not perceived as particularly relevant, we will now turn to two main tensions that emerged from the findings. These tensions are between strategy and practice, and between proximity and distance.

Strategy vs. Practice

Ahead of the 2021 Norwegian parliamentary election, political authorities warned against the spread of unwanted foreign influence campaigns, followed up by NRK's ethics editor who gave a thorough briefing to journalists and editorial managers. He warned against

foreign influence operations in relation to the election and asked them to be especially vigilant against attempts to spread mis- and disinformation through NRK's digital channels. Checking facts and sources ought to be more important than ever before.

During our period of observation in NRK, we did not hear any direct reference to the ethics editor's brief, nor did we see changes in their fact-checking methods rooted in these warnings. Instead, we observed and talked to journalists that expressed confidence in their working methods. We also picked up comments from journalists suggesting the editor was exaggerating the threat regarding disinformation. Some of the journalists did mention "Troll factories" and the risk of unintended use of disinformation in their media production, but the awareness of a potential threat was not connected to discussions on verification methods or the use of technology. They emphasised the importance of source- and fact-checking and a few of them equated directly the verification requirement that always rested on journalists, not only in connection with the spread of disinformation. The findings therefore indicate a mismatch between the strategy imposed by management, and the newsroom practice – a tension that may be caused by social structures and individual characteristics. The journalists overlooked the strategy from management, in order to follow their own "gut feeling", which is an important part of journalistic culture (Schultz 2007).

Throughout observation of the production process, we often saw NRK journalists working under time pressure. However, lack of time or other resources were not mentioned when journalists walked us through their working methods. More often, they referred to traditional journalistic methods and virtues when explaining their activities. The political journalists also brought up their proximity to sources and topics that made advanced verification tools redundant, as we saw in Nordlys.

Another element concerning the tension between strategy vs. practice is how a newsroom could have a strategy of implementing advanced verification technology that in practice was not as useful as anticipated. In Faktisk.no, we observed fact-checkers turning off advanced fact-checking tools to maintain a manual overview during one of the political debates. This related to an in-house developed, automatic claim-identification application that worked on top of the text stream from NRK. The live text stream produced by NRK appeared as a feed within this application and it included AI-based features to automatically colour-mark names and potential claims and link to relevant content. But the fact-checkers turned off these automated features during the live fact-checking of the political debates broadcasted by the NRK. They only used the tool as an interface to access the live text stream and manually identify claims, which they copy-pasted into a shared Google spreadsheet that they all worked on. "It's too much noise", said one of the fact-checkers when asked why he didn't use the automated features. He felt all the automatic colour-marking and linking were distracting him from identifying claims since the automatic detecting still had to be manually checked afterwards. It was faster and more convenient to do the whole process manually.

To some extent, this reluctance to use technology the newsroom had developed themselves had to do with maintaining autonomy, which is an important value for journalists (Min and Fink 2021). The fact-checkers felt a need to maintain control over the whole claim-identification process and implementing the full features of the automated claim-identification tool would mean giving up on some of this control - even if the tool was developed in-house, based on needs they themselves had identified. This example thereby also speaks to the power of established news practices and routines, which

may serve as obstacles to the implementation of new strategies especially when they involve technology and tools that replace functions that are traditionally linked to professional (gatekeeping) control (Lewis and Westlund 2015; Lindner 2017).

The fact-checkers also had some issues with how the automatic claim identification tool on Facebook worked. This tool, which is part of the third-party fact-checking program initiated by Meta, automatically marks posts that potentially contain mis- or dis-information and creates a feed of these posts. But according to the fact-checkers this automatic detection did not work that well for a small language such as Norwegian. One fact-checker said:

I can't remember having found anything relevant in that feed. Maybe we at some point have found something relevant, but most of the time we detect it before it appears in that tool. I wish we had a tool that could provide us with a better overview (*Interview 26*).

In spite of these gaps between the intention behind a developed technology and its actual use, the fact-checkers had not lost faith in new automation technology's potential to improve fact-checking practices. One of the fact-checkers we interviewed said: "My dream is that when I come to work, a program has collected every factual claim that has been aired on NRK and TV 2 during the day and evening. But we're not there yet." (*Interview 23*)

Proximity vs. Distance to the Beat and Sources

Most journalists have sources they know and trust. This applies in particular to local and regional journalists, for whom proximity is a key value (Jenkins and Nielsen 2020). But it also applies to reporters covering a certain beat, like politics, where it is common to develop networks of sources (Magin and Maurer 2019). Findings from this study show that many journalists point to proximity to the beats and sources when justifying why verification technology is not perceived as relevant for their daily activities.

One example from Nordlys shows how journalist's familiarity with the sources may shape their verification practice. Most of Nordlys' journalism is based on known sources and information from the newspaper's immediate area. During the election period, Nordlys had a small group of journalists that worked specifically with political news stories. Their aim for the coverage was to set the agenda independently of political stakeholders, which can be challenging. A description of a typical work process that resulted in an election-related story can be used as an example: One of the political journalists is about to interview a high-profiled politician who is coming to town. On the return to Nordlys, the journalist remarks "this will be the most boring story ever created". When asked if he has to write the story, he replies:

I have spent half a day on this story and I will spend another half hour to spit it out, "cause with the resource situation we have now ... It will be difficult not to. And besides, many people were present who saw that Nordlys was there, so they will wonder if nothing comes out. You know this is not the New York Times, these are people we meet again on the main street. (*Ad-hoc interview during observation*)

During the writing process, the journalist checks his archive for details about the job-creating centre where he met the politician, a centre he has written articles about earlier on. He explains that there were some facts presented but this is not a typical fact story, this is about the people using the centre. He quickly searches the political

party's website, before finishing the story. The work is characterised by journalistic routine where he uses his gut feeling (Schultz 2007) to make decisions along the process. When asked about the use of tools, he replies that these are sources and topics well known to him, and he is in no need of advanced tools to do the job. The journalist refers to the closeness to sources and topics when explaining the non-use of advanced verification tools. Rather than technology, other structural elements seemed to influence the work process: time pressure and lack of resources.

Also in NRK, familiarity with sources in politics was important for certain beats. And in Faktisk, the credibility of sources from previous assessments and use was highlighted as important.

A possible interpretation of the findings could be that the verification technologies available are neither particularly useful nor adapted to the journalists' tasks. This aligns with a perspective argued by Zelizer (2019, 343): it is "journalism that gives technology purpose, shape, perspective, meaning and significance, not the other way around". Technology must be shaped to meet journalists' needs, not the opposite. Moreover, the journalists see the risk of passing on disinformation or being used by foreign actors as minimal, since they are dealing with familiar material. In sociotechnical terms, it seems that verification practices remain a human-centric form of journalism (Lewis and Westlund 2015) in which technology plays a subordinate role, even in times where digitally produced and distributed disinformation is high on the agenda and in digitally advanced contexts, like the Norwegian media market.

At the same time, we see differences within the same newsrooms and within the same beat that can be explained by individual characteristics, not social structures. In Nordlys, we experienced that a younger, more tech-skilled political journalist used more advanced verification tools than her older colleague. The example raises the question of whether it is only proximity to sources and beats, or other factors like skills and individual agency, that determine whether journalists find advanced tools relevant for the news production process. Previous research on what drives innovation in digital journalism has found that individual agency is an important factor, which can bypass structural obstacles to change practice (e.g., Paulussen 2016; Steensen 2009)

Distance to the beat and sources can on the other hand enhance the need for advanced tools. During our observation in NRK, a journalist shared experiences from working with foreign news. Covering the Taliban takeover of Kabul during the summer of 2021 the non-use of image verification tools among the journalists on duty affected the work process. The fall of Kabul was presented for NRK viewers without the images of people falling from planes – the dramatic pictures that more than anything illustrated the crisis – since the journalists on duty did not have the skills and time needed to verify the images.

There is talk about this in the newsroom, whether we are too careful about using images from social media and other less formal sources. One example is the pictures and footage from Afghanistan recently, of people falling from planes. This was never shown on NRK, cause when we eventually verified it, the footage was shown everywhere else. The question is now, did NRK miss "The Saigon Moment" because we couldn't verify the images? (*Interview 09*)

The journalist argues that NRK should be the one publishing images of important news stories, it's part of the mission of being a public broadcaster. Later on, we learned that the manager of this particular journalist's department had asked the staff to step up

and learn how to verify and use more pictures and footage from social media. The example shows how non-use of technology can affect the journalistic process. NRK never published the iconic picture, due to verification uncertainty. The image of discussion was from Afghanistan and we can expect that such dilemmas more often appear in the context of foreign news than in election-related journalism, where the actors are closer to both sources and events.

The example shows that there seems to be a verification tension between journalists covering domestic affairs nearby and journalists covering foreign affairs,

Conclusion

This study asked to what degree Norwegian journalists use verification technologies (RQ1) and how they perceive the relevance of such technologies during an election period (RQ2). The findings from our newsroom observations and interviews reveal the complexity of the perceived relevance and potential adoption of technology. This complexity is marked by several tensions between professional and organisational culture, work routines, individual agency, and technological affordances. In a sociotechnical perspective, the findings could indicate that Norwegian journalists do not accept a juxtaposition of humans and technologies. The task at hand dictates if and how verification technology is used by journalists. This study suggests that some verification technologies, specifically related to image verification, are perceived as more relevant than others among Norwegian journalists. The findings also suggest that younger, especially male, journalists perceive verification technologies as more relevant than others. Individual factors such as age, gender, skills and type of employment adds to the tension between new tech initiatives and existing routines in the newsroom. Tensions between strategy and practice, between proximity and distance to sources and between types of beats, impact journalists' use of verification technologies.

This study thereby identifies several possible reasons for the gap between the verification technologies and the actual relevance of such technologies to the practice of journalists. Moreover, our study indicates that disinformation as a threat to public discourse and democracy is not very relevant to the daily practice of Norwegian journalists, even during election times. This stands in contrast to the emphasis on this threat in both academic and political discourse (Bradshaw and Howard 2019; Marwick and Lewis 2017; Wardle and Derakhshan 2017), and supports arguments about the threat of misinformation being overstated (Altay et Al. 2023)

The study has some limitations related to the data collection process. Firstly, The observation periods were carried out during the election period, and were therefore relatively short. There were still COVID-19 restrictions on some of the meeting activities in NRK, and physical instead of digital meetings could have provided richer data from the journalistic planning process in this media house. Longer observation stays in the three newsrooms could have provided greater insight into how journalists work with verification and technology. Secondly, the limited access to digital internal communication we experienced, especially at NRK, may have restricted our insight. These limitations are counteracted somewhat through our use of mixed methods - where interviews supplement the observations. Thirdly, the field is a moving target. The technological development, the media industry, and not least the surrounding society, are constantly changing. Russia's invasion of Ukraine has raised Norwegian

journalists' attention and knowledge of the spread of disinformation since our fieldwork took place. Several journalists have received training in verifying images through a joint collaboration (Verifiserbar) within the media industry where NRK and Faktisk are among the initiators. We must therefore assume that our study of Norwegian journalists' use of verification technology could have had a different outcome today.

Future research should dive deeper into these gaps between discourse and practice and examine their presence in other cultural, political and professional settings. Our study provides some answers to journalists' use or non-use of verification technology, but future research can delve deeper into the aforementioned tensions. We would encourage researchers to explore in further details the tension pairs we have identified here and how they impact journalists' use of verification technology. Particularly when it comes to proximity and distance to sources we can expect to find similar tendencies as in the Norwegian case: big distance to sources will potentially make journalists more vulnerable for information manipulation, and more dependent on verification technologies. This study also demonstrates a need to employ a comparative perspective to examine how size, beat and demographic factors impact the use of technology in newsrooms. Moreover, our findings suggest that journalists working on certain beats, like foreign/international politics and war and conflict reporting may be more prone to adopt verification technologies than others.

Similarly, the other tension we identified, strategy vs. practice, should also be examined further. Today, the verification stage is predominantly characterised by human-led technologies developed by tech providers, and to some extent in-house by fact-checkers and publishers (Westlund et. al, 2022, page 227). We might see changes if more journalists were involved in the development of the tools aimed at the verification stage of the fact-checking process that could further align practice with strategy. Thus, it will be of interest to explore the origin and quality of the available verification technology, and future studies should delve into this topic more extensively.

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