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At the crossroads of logics: Automating newswork with artificial intelligence—(Re)defining journalistic logics from the perspective of technologists

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Abstract

As artificial intelligence (AI) technologies become more ubiquitous for streamlining and optimizing work, they are entering fields representing organizational logics at odds with the efficiency logic of automation. One such field is journalism, an industry defined by a logic enacted through professional norms, practices, and values. This paper examines the experience of technologists developing and employing natural language generation (NLG) in news organizations, looking at how they situate themselves and their technology in relation to newswork. Drawing on institutional logics, a theoretical framework from organizational theory, we show how technologists shape their logic for building these emerging technologies based on a theory of rationalizing news organizations, a frame of optimizing newswork, and a narrative of news organizations misinterpreting the technology. Our interviews reveal technologists mitigating tensions with journalistic logic and newswork by labeling stories generated by their systems as nonjournalistic content, seeing their technology as a solution for improving journalism, enabling newswork to move away from routine tasks. We also find that as technologists interact with news organizations, they assimilate elements from journalistic logic beneficial for benchmarking their technology for more lucrative industries.

1 | INTRODUCTION

1.1 | Situating artificial intelligence in newswork

As artificial intelligence (AI) technologies move from the realm of academia into public conversation, their impact is diffusing throughout a wide array of industry sectors, reshaping how work is organized (Davenport & Kirby, 2016; Haenlein & Kaplan, 2019; Østerlund et al., 2021). Technological advances have also allowed

AI to enter areas previously not seen as viable, even including “interpretative labor” such as journalism (Carlson, 2018, p. 1765). AI technologies are now being integrated into news organizations throughout the entire production pipeline, impacting content, audience relations, and distribution (Diakopoulos, 2019; Hansen et al., 2017). In this paper, we focus on AI technologies used for automating journalistic content, using natural language generation (NLG) to create news stories. Through in-depth interviews with representatives from service providers of NLG technologies in Europe and the

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United States, we explore the process of implementing automated journalism. We apply institutional logics as a theoretical framework for analyzing how the technologists describe their interactions with journalists, identifying the building blocks of the logic that influences how the systems are designed and implemented and how they are intended to affect newswork (Ocasio et al., 2017; Thornton et al., 2012).

As with other expert organizations, newsrooms have a long history of using technology that shapes their practices and products (e.g., Waisbord, 2013; Zamith & Braun, 2019). At this time, however, AI is perceived as one of the main disruptors of the news industry (Beckett, 2019; Newman, 2022), where the term *artificial intelligence* (AI) covers the algorithms and automation used for a wide range of activities such as interview transcription, workflow automation, content generation, and personalization (Newman, 2022, p. 35). In line with Østerlund et al. (2021), we propose a bilateral impact between AI and work, each influencing the other. We approach AI in newswork from a sociotechnical systems perspective, understanding AI as intelligent technologies that created by humans (Napoli, 2014, p. 350) and thus embedded and encoded with human values (Broussard et al., 2019, p. 7). We use the term *newswork* as suggested by Schudson (1989): as a form of social relations that organize knowledge labor according to specific practices in order to construct news. Approaching how the logic of technologists influence newswork, our aim is to study the “human and institutional choices” entangled in designing algorithms for AI systems (Gillespie, 2014, p. 169).

Examining these design choices is immediately relevant, as AI technologies are increasingly affecting daily life and work, “augmenting and even replacing human decision-making” (Venkatasubramanian et al., 2020, p. 1). The number of AI technologies applicable to transforming work in organizations is increasing considerably, resurfacing debates around the consequences of automation (Jarrahi, 2019). These “smart machines” are often portrayed as having a Janus face: either eliminating jobs through automation or improving human work through augmentation (Davenport & Kirby, 2016). Similar debates can be found in studies of how news organizations interact with AI technologies. Whereas technology previously has been seen as an “aide” to journalism, automated journalism—with its increasingly independent ability to produce news—raises the question of whether this partnership is changing, with humans becoming the aide to technology (Zamith & Haim, 2020, pp. 1–2). The use of AI as a journalistic technology has led journalists to stress the foundations of their professional logic, as an individual “creative process” providing audiences with background and context, and as a “craft” performed by humans (Schapals & Porlezza, 2020, pp. 23–24).

The presence of AI technologies in newsrooms has been studied largely from the perspective of newswriters and media management, through qualitative interviews and case studies (e.g., Milosavljević & Vobič, 2019, 2021; Schapals & Porlezza, 2020; Sirén-Heikel et al., 2019), or from the perspective of audiences, for example examining how machine-generated content performs in comparison with stories written by journalists (Graefe & Bohlken, 2020). Research into the practical implications of AI for newswork is still nascent, as is the study of the perspectives of the technologists creating these technologies. Our paper contributes to understanding the impact of AI at work by focusing on the technologists, broadening the scope of studying newswork to encompass actors beyond the traditional roles in the newsroom (Boczkowski, 2015, p. 67).

Building on the work by Wu et al. (2019) interviewing technologists developing AI tools for news organizations, this paper expands the exploration of the external “pressures and powers” (p. 1239) that technology companies assert on news organizations to discern the influences that journalism exerts on technologists. A question warranting further examination is if and how professional journalistic logic influences the logic of the technologists (Anderson, 2013). By applying institutional logics as a framework for analyzing how our respondents experienced the process of designing and implementing their technology in newsrooms, we identify how the technologists share a *theory* of AI technologies as rationalizing the work of news organizations, a *frame* of optimizing newswork, and a *narrative* of news organizations misinterpreting the technology (Thornton et al., 2012). These building blocks shape the outlines of the shared logic of the technologists, which *assimilates* dimensions of journalistic logic as it *competes* for influence over how to understand the technology and its impact on newswork.

In the following sections we outline the emergence of AI in news journalism, briefly introduce NLG as a technology, and situate our paper in the theoretical framework of institutional logics. Before presenting our findings, we summarize the elements that shape journalistic logic and the logic of technologists, and outline our methodology.

2 | LITERATURE REVIEW

2.1 | AI enters the newsroom

The field of journalism has seen its business model disrupted by digitalization and platformization, resulting in diminishing revenue from advertising, changing audience behavior, and turmoil in distribution (e.g., Lindén, 2017; Min & Fink, 2021; Zamith & Braun, 2019). AI

has been portrayed as a way to bolster business, improve journalistic work, and strengthen audience relationships (Beckett, 2019; Newman, 2021). According to an international survey of 71 news organizations in 32 countries conducted by the media think-tank at the LSE, Polis, respondents see potential for AI throughout the whole production process, from news gathering to news production and distribution (Beckett, 2019). The main motivators for engaging with AI are increased efficiency in newsroom and business functionality, in combination with improving relevance for audiences (Beckett, 2019). AI is seen as having potential value for a wide array of applications, such as content recommendation, improved tagging, automated stories, summaries, and text-to-audio using synthetic voice technologies (Newman, 2021, pp. 31–32; Newman, 2022, pp. 35–36); data cleaning, extraction, and linking records (Stray, 2019, p. 1094); and identifying news angles (Motta et al., 2020). In its current form, AI is useful in journalism for stories that would otherwise be too resource-intensive or technically infeasible (Hansen et al., 2017, p. 4).¹

Slightly less than half of the organizations in the survey by Beckett (2019, p. 46) claim that AI already impacts their work, whereas the majority imagined AI entering their organizations within 1–5 years. The respondents in the survey, which covered both global, regional, and local news organizations, are generally considered to be “early-adopters” and “tech-savvy” (Beckett, 2019, pp. 41, 52), suggesting that the diffusion of AI technologies in news organizations correlates with funding, skills, and organizational culture (e.g., Schapals & Porlezza, 2020; Wu et al., 2019). Cost-effectiveness is an issue, with smaller news organizations worrying about keeping up (Hansen et al., 2017, p. 7; Newman, 2021, p. 31). There are acknowledgments that the hype surrounding AI can lead to misjudgments of what the technology is best suited for (e.g., Beckett, 2019). Similarly, the promised effects of AI are dependent on leadership willing to invest in quality journalism, rather than seeing the technology as an opportunity for cutbacks (Sirén-Heikel et al., 2019). The threat of cutbacks has been countered from the onset by service providers framing automation as augmenting journalism, rather than replacing journalists (Carlson, 2015, p. 420). The narrative of augmenting, or hybridizing, newswork with AI is present in several studies (e.g., Diakopoulos, 2019; Lindén, 2020a; Schapals & Porlezza, 2020), yet a central argument for the use of AI is increasing efficiency through increased audience retention and reduced labor costs (Wu et al., 2019, p. 1248). Publicized examples of layoffs due to AI are rare, such as the decision by Microsoft to cease the use of human editors for curation and editing in its Microsoft News service (Waterson, 2020).

Some of the potential effects of AI are also viewed as pitfalls. Emphasizing personalization can erode the ideal of journalism as a public service, reducing it to marketing (Hansen et al., 2017, pp. 11–12), whereas a reliance on data-driven tools can erode editorial autonomy (Milosavljević & Vobič, 2019, pp. 1108, 1110). AI solutions can also have cascade effects: moving reporters from writing to data management and editing automated stories for clarity and context, and overriding the need for traditional news outlets by providing direct access to automated content, especially in the case of sports news (Kunert, 2020).

2.1.1 | AI for automating news content production

Several technologies now branded as AI have previously been employed in newsrooms under labels such as automated, algorithmic, or intelligent. Notably, “automated journalism” is used both in a wider sense for any automated application of algorithms on news (Wu et al., 2019) and more specifically for algorithms generating news narratives that are difficult to distinguish from nonautomated content (Graefe & Bohlken, 2020). As definitions are evolving, this form of automated generation of news texts is also termed “algorithmic journalism,” “robot journalism,” “automated news” (Danzon-Chambaud, 2021), or “news automation” (Sirén-Heikel et al., 2019).

We focus on service providers of natural language solutions that use structured data as input to create text narratives as output. NLG, a subfield of artificial intelligence, enables the output of large amounts of stories in a matter of seconds, typically using rule-based models. More independent models, for example based on machine learning (ML), face difficulties due to the low tolerance for unpredictability typically associated with journalism, meaning that hybrid approaches combining ML and rule-based systems are more realistic short-term (Diakopoulos, 2019, p. 101). The rule-based approach involves a great deal of choice making, which is a characteristic that sets NLG apart from other natural language processing (NLP) technologies (Reiter, 2013, p. 13e). It is also what would typically be referred to in newswork as editorial decision making (Diakopoulos, 2019, p. 99). By design NLG functions best in data rich domains (Dörr, 2016) such as sports, elections, and financial reports.²

Many providers of NLG solutions primarily sell their services to industries other than news organizations, for example as tools for e-commerce and business insights. Journalism is viewed as a way to test the software and

give it publicity (Carlson, 2015). Different companies provide different solutions for automated content; some offer products that function as platform-as-a-service, such as Automated Insights, software-as-a-service, such as Narrative Science, or content-as-a-service, functioning in a similar way as a news agency, such as United Robots. Some companies offer users the option to modify the content and look of the generated text, or use it as a baseline for further editing, whereas other systems publish stories directly. Certain providers aid news organizations in locating data sources (Kunert, 2020), yet responsibility for data accuracy and output errors is most often placed with the data providers and publishers.

The perspectives of technologists involved in developing AI solutions applied in journalism have been studied to a lesser extent. This paper builds on this endeavor to understand the influence exerted by AI technologies on journalism by studying the logics underpinning the construction of the technical solutions.

2.2 | Institutional logics as a theoretical framework

Institutional logics is a metatheoretical framework within organizational studies, developed as a perspective for understanding “interrelationships among institutions, individuals, and organizations in social systems” (Thornton et al., 2012, p. 2). Emerging in the 1990s, institutional logics departs from seeing organizations as involved in “mindless” isomorphism leading to similarity in organizational forms and practices (Thornton et al., 2012), allowing instead for mindful agency, “cultural differentiation and pluralism” (Ocasio et al., 2017, p. 509).³ Viewing society as an inter-institutional system, the theory allows for materiality, culture, and historical contingency, aligning itself between “rational choice theories and macro structural perspectives” (Thornton & Ocasio, 2008, p. 101). Instead of focusing on the individual, or the societal structure, institutional logics focuses on how these are intertwined. Practices and behaviors are shaped by a variety of institutional logics “that guide situated action and decision-making” (Ocasio et al., 2017, p. 512), and are dependent on context. A main premise is seeing agency as embedded, resulting in outcomes negotiated through interplay between individuals and structures, enabled yet also constrained by prevailing logics (Thornton & Ocasio, 2008, p. 103).

Institutional logics is useful for understanding how actors in separate fields construct organizing principles, practices, and norms, how these framings influence identity and sensemaking, create shared narratives, and shape theories for seeing the world (Ocasio et al., 2017;

Thornton et al., 2012). Fields are contexts or cultures that share language and practices that enable belonging (Thornton et al., 2012), that develop or adopt logics corresponding to their environment. Put succinctly, an institutional logic is “the way a particular social world works” (Jackall, 2009[1988], p. 118). Individuals embedded in a certain logic may experience it “as an objective set of norms,” rendering their role in upkeeping the logic invisible (Jackall, 2009[1988], p. 118). Yet individuals make the logic durable, as logics are created, recreated, and enacted through practices and vocabularies (Ocasio et al., 2017). Logics are not “static structures” (Thornton et al., 2012, p. 77), but susceptible to change both from internal and external forces, affecting the behavior and normative conceptions of the individuals embedded in these institutions. Logics evolve, appear, and contract.

The NLG technologies applied in news production embody specific logics embedded in their design (e.g., Napoli, 2014): they both construct a new form of content, with specific affordances beyond what news organizations are able to create with human resources, and constrain the content, based on predefined rules and technical limitations. Therefore, these systems represent a specific case of intersecting logics from separate fields, as they are embedded in a technological rationale of systematizing output, yet the process is aligned with rules and norms from journalism. Studying a logic connected to an emerging technology, and hence an emerging field, we analyzed our interviews for the “symbolic representations” that function as building blocks for logics: the theories, frames, and narratives that guide how technologists perceive themselves and their technology in relation to newswork and journalism (Thornton et al., 2012, p. 149).

Theories, frames, and narratives are derived from societal-level logics, enacted in practices, and reified through vocabularies into field-level logics (Thornton et al., 2012, p. 151). The three types represent different levels of abstraction and have separate functions in the creation of a field-level logic. Theories represent the most abstract form, providing explanations from societal-level logics for “why and how institutional structures” work the way they do, and can be used for motivating change (Thornton et al., 2012, p. 152). Theories can emerge from economics or business management, such as microeconomic theory or scientific management theory. Vocabularies or word choices reflect the origins of theories, which are then used to create the frames that are used for interpreting and situating events. Frames are “explicitly articulated” symbolic constructions, shaping the culture of a group and creating collective meaning through narratives (Thornton et al., 2012, pp. 154–155). For example, whether a new software is a success or a failure can

be framed quite differently, depending on if one asks a technologists or a user (see Orlikowski & Gash, 1994). As theories or frames are more generally applicable, narratives make sense of phenomena in a more specific context and can be used for assigning a story to actions or events, shareable within a group (Thornton et al., 2012, pp. 154–155). Narratives function as explanations or justifications, for example for why a particular reform is necessary.

Applying this theoretical framework in our analysis allows us to examine how the interaction with the news organizations affects how technologists construct their logics, shedding light on how these negotiations are folded into the systems and services employed in newsrooms. In the following section we trace a path for the elements that define how the professional logics of journalists and technologists come to be, paving the way for understanding why and how they might differ.

2.2.1 | Intersecting logics of journalism and technology

Journalism as a profession lacks formalized credentials, leading to a focus on boundary work through expertise and authority, enacted through norms and practices, with attached values (Waisbord, 2013). Norms, such as a high degree of autonomy, integrity, and contributing to democracy, enable and legitimize distancing from other institutions and the pressures they exert (e.g., Deuze, 2005; Hanitzsch & Vos, 2017; Lewis, 2012). Practices tied to journalism, such as assigning newsworthiness, story selection, and ordering, grant the profession authority over its domain (Carlson, 2015, pp. 418–419). Values such as factuality, neutrality, objectivity, ethics, and a responsibility towards the public sphere, differentiate the profession from other content creators and assign credibility (e.g., Deuze, 2005; Kovach & Rosentiel, 2007; Waisbord, 2013). Taken together, this knowledge production according to “distinct premises and values” (Waisbord, 2013, p. 130), “codes and rules” defining “production routines” (Zamith & Braun, 2019, p. 1), forms a professional logic aimed at protecting journalism from external pressures, legitimizing their expertise, and organizing newswork. In effect, the logic of journalism is a performative, social process of professionalizing the field, seeking to create and uphold distinctness and legitimacy.

However, the question of what constitutes quality journalism remains unanswered, with multiple understandings of the underlying assumptions (Waisbord, 2013). The divisive and evolving nature of journalistic identity has escalated through digitalization, as news organizations increasingly operate in a hybrid domain,

negotiating between several competing and overlapping logics (Lischka, 2020). The contemporary journalistic logic is adopting to an “audience turn” (Zamith & Braun, 2019, p. 4), moving the focus towards the individual needs of audiences (Carlson, 2018). From the perspective of market logics, news journalism is a business where technology enables “smarter,” more “efficient work,” “liberating” journalists (Raviola, 2012, pp. 947–948). Although there are examples of convivial relationship between newsrooms and innovative technologies (e.g., Diakopoulos, 2019; Schapals & Porlezza, 2020), other examples point to apprehension. Dierickx (2019) describes a Belgian newsroom struggling to implement news automation; similarly, Belair-Gagnon et al. (2020) found intrapreneurial units experimenting with chatbots grappling with reconciling tensions between corporate logics and the professional logics of the newsrooms.

New technologies are often brought into newsrooms that are advancing logics tied to management and business, with technologists enlisted to apply these technologies to newswork (e.g., Min & Fink, 2021). The technologists in the study by Wu et al. (2019) sought to improve journalism by “providing the tools” and applying a “Silicon Valley ethos,” focusing on audiences as consumers, maximizing access to data, and viewing journalism as a consumer product (pp., 1247, 1251). To successfully embed automation in journalism, these technologists understood that the professionalization of the newsrooms had to be reshaped by adding new skill sets that embody technological logics (Wu et al., 2019, p. 1250). These skill sets are often connected to material artifacts, such as tools for analytics, thus reshaping the logics of journalism by combining market logics with technology to fit journalism into the platform economy (e.g., Christin, 2020).

Whereas journalism is a profession that can be performed independently of specific training, the professions of technologists usually rely on recognized credentials from areas such as computer sciences, software engineering, or data analytics. The elements of the professional logics of technologists appear to be less clearly articulated compared to journalism. Studies of technologists working with AI point to ongoing and situated sensemaking of the workings of algorithms, qualities of data, and negotiating system affordances with business expectations (e.g., Dhanorkar et al., 2021; Passi & Sengers, 2020; Wolf & Paine, 2020). Seeing the world through data and algorithms requires a form of “craftsmanship,” a logic of abstraction passed on in learning environments that allows practitioners to make sense of messy data and situate algorithms into challenging empirical realities (Passi & Jackson, 2017, p. 2444). Building algorithmic systems involves modular (or computational) thinking:

deconstructing problems into units and then using decision-trees to solve them (Svensson, 2021). Studying programmers in several countries, Svensson describes informants identifying with creating complex, abstract systems that make things “work” (2021, p. 87). Creating code that “performs work” requires knowledge of programming languages (Kitchin & Dodge, 2014, p. 25), a highly in-demand skill, with programmers often viewed as an “elite” (Svensson, 2021, p. 20).

However, high-level abstraction risks removing focus from the origin of inputs, obscuring the understanding of how the systems that lead to specific outputs actually work (Selbst et al., 2019). As a result, the complexities of AI technologies can cause tension between developers and users, with information asymmetries causing mismatches in how to successfully explain the workings of systems and what can be expected from them (Dhanorkar et al., 2021; Wolf & Blomberg, 2019). The issue of insight and understanding is part of a larger discourse on defining transparency in AI, as different stakeholders have different views on what information is relevant for comprehension, and what level of comprehension is sufficient or beneficial (Felzmann et al., 2019; Larsson & Heintz, 2020). Complicating things further, complex AI models are often proprietary knowledge, yet are also dependent on knowledge transfer from domain experts to be successful (Newlands, 2021). Even as technologists themselves resist narrating AI as “magic” (Dhanorkar et al., 2021; Wolf & Paine, 2020), the narrative has benefits from a business perspective. Exploring the Silicon Valley ethos from the perspective of how the US tech industry relates to implementing ethics standards, Metcalf et al. (2019) identified what they name three “core logics”: meritocracy, technological solutionism, and market fundamentalism, which are “intersecting and mutually reinforcing” (pp. 460, 466). Similarly, studies of belief systems in global technology companies show premiums placed on enhancing efficiency through the application of data and AI (Burrell & Fourcade, 2021;

Zuboff, 2015), which are then diffused on a global scale through the ubiquity of their technologies and impact industries such as journalism (Lindén, 2020b).

Applying AI technologies in news organizations requires interaction between the logics of journalism and the logics of technologists. Do these interactions imply a migration of decision-making from newswriters to technologists, moving journalists “from a direct to an indirect role” in shaping news (Napoli, 2014, p. 350)? Are technologists identifying with infiltrating the newsrooms (Wu et al., 2019, p. 1252)? By applying institutional logics as a framework, we examine how technologists situate themselves in relation to journalistic logic, and how they situate their AI technologies in relation to newswork.

3 | METHODOLOGY

To examine how AI technologies are employed in news organizations for generating news, we explored companies that develop and sell NLG services for journalism. Based on insights from the news industry gathered from previous research by the authors (Lindén et al., 2019), 11 companies that provided solutions for news generation were identified and contacted. Nine companies agreed to take part in the study, conducted between March to May 2019 (see Table 1). The companies are based in seven different countries, in Europe and the United States, and differ in primary focus; some mainly provide systems to produce news texts, whereas others predominantly target customers by producing nonjournalistic content, with generation and distribution models varying between companies. As the industry is nascent, the companies differ in size, market reach, and age, allowing us to analyze both established players and new entrants to the field. Out of nine interviewees, two were women. At the time of writing, some of the companies appear to have moved away from producing journalistic content, based on information from their websites.

TABLE 1 List of participants. Specific titles have been omitted as to avoid identification

Position	ID	Background	Date of interview
C-level	P1	Journalism; social sciences	Mar 15, 2019
C-level	P2	Computer science	Mar 25, 2019
C-level	P3	Journalism	Mar 22, 2019
C-level	P4	Business administration	May 28, 2019
C-level	P5	Computer science; linguistics	May 29, 2019
C-level	P6	Linguistics	Mar 27, 2019
Sales	P7	Business administration	Apr 3, 2019
C-level	P8	Computer science	Apr 15, 2019
Communications	P9	Communication studies	Mar 21, 2019

Through semistructured reconstructive interviews, the participants described one or more projects that involved producing automated stories for newsrooms. The interviews were designed to elicit reflexive perspectives on how the participants aligned themselves in relation to their customers in journalism, and how this might have changed during the process of the project. The interview guide was formulated based around five subjects: how the project started, how the product was designed, and how it was implemented, concluding with a retrospective of the project and self-reflection around AI in journalism (Data S1, Supporting Information). The interviews were conducted over Skype, spanning on average an hour each, recorded, and transcribed verbatim. The interviews were analyzed through repeated close reading, followed by an open coding with a QDAS based on our research questions and further re-coded as informed by our theoretical framework (Braun & Clarke, 2006).

4 | FINDINGS

The participants in this study represent different educational backgrounds, cultures, and languages, yet in the interviews we find a shared sensemaking of their relationship with journalism. The presupposition that technologists and journalists occupy separate fields of logic is validated through our interviews, as P9 explains with the example of “being on this side and also knowing the journalism side.” Here we attempt to parse the building blocks of the logics of the technologists, by analyzing the *theories*, *frames*, and *narratives* that shape how they position themselves in relation to journalistic logic (Thornton et al., 2012). These forms of “symbolic construction” (Thornton et al., 2012, p. 152) together sculpt how logics within an industry emerge, in this case the field of companies producing AI technologies applicable to journalism. We identify how the companies share a theory of rationalization, a frame of optimization, and a narrative of misinterpretation in newsrooms. Further, we discuss how this logic *competes* with the professional logic of journalism yet also *assimilates* elements from it that benefit the service providers.

4.1 | The theory: Rationalizing news organizations

In the setting of the journalism industry, the prevailing theory among our participants is seeing AI solutions as an inevitable evolution of the journalistic field. Theories are abstractions deriving from societal-level institutional logics, providing “general guiding principles

and explanations for how and why institutional structures and practices should operate” (Thornton et al., 2012, p. 152). Steering the theory is a consensus that news organizations are in a state of crisis, in need of reconsidering business models and rationalizing workflows, in line with how other industries have adopted AI. When asked how the technology will change journalism, P2 referred to how, as a result of changes in audience behavior and business models, “automation will save journalism, the same way that automation saved the auto industry or finance industry ... I see that there's only [one] way to move forward.”

This inevitability is packaged as added value in such a way that news organizations “can't really argue,” as the technology provides such efficiency “in a way that's unbelievably more cost-effective than hiring even one person to do all these stories, and it's in seconds [...] the negotiation process isn't really a negotiation process, because the value's so high” (P9). As exemplified by participant P9, the ability of “scaling the organization” using existing resources is effectively “empowering” the organizations, or as stated by P2, “we have a clear view of how we can help them.”

For the technologists, the rationalization is translated into abstracting and quantifying actions and decisions into concepts of volume, variety, and velocity (Lindén et al., 2019): scaling and personalization through data. They argue that news organizations should adopt practices and thinking from technology companies, reconsider their business models, and upskill journalists. Discussing the future for news organizations, P6 stated:

... my recommendation would actually be professionalizing. Looking more at the IT companies. Looking more at their development philosophies. Their product designing philosophies. And really just cutting off a slice from that and incorporating that into how editorial boards work. That's definitely going to do some good in terms of editorial companies being able to harness that technology properly.

AI is viewed as allowing for new revenue streams by personalizing newsworthiness, enabling a much more granular focus than is possible with existing human resources. P7 discussed children's activities, such as hobbies or sports, that are of interest to parents and caregivers but not to the general public: “... if you can automate the market, and now you can provide that service at a much cheaper price point, you're serving an audience that wasn't served, but that's news to them.” The theory derived from prevailing societal-level logics can be

distilled as solutionist, rationalizing news organizations by solving the problem of reaching audiences at scale without adding human resources. By doing so, newswork can refocus on creating value for audiences.

4.2 | The frame: Optimizing newswork with AI

The framing of AI in journalism centers around optimizing newswork, freeing journalists from having to do “boring news that doesn’t add any value” (P2), viewing stories that can be automated as “mundane” (P6). This framing derives from the theory of rationalization, verbalized through a normative conceptualization of what journalism ought to be. Frames “facilitate identification and mobilization” (Thornton et al., 2012, p. 152) within groups, are explicitly expressed, and allow for a shared understanding of a problem at hand. In helping news organizations create a “success story” (P6), the interlocutors stress the importance of good journalism, essentializing journalism into a product that an audience desires and has need for, yet is sacrosanct for functioning societies. Working with the journalism industry is seen as supporting what they find valuable, as explained by P5:

For us it’s fun to do. Working with text is fun, and here we see some impact. I believe that news [is] important. I don’t want to get all my knowledge of the world from Facebook or simple reports. I actually want to see the [...] analysis of what happened, and commentaries, and so on. If we can remove some of the tedious, boring, and automatable part of the job of a journalist, we are doing a little bit to help them to focus on what’s important.

Routine news stories on data-rich domains can be offloaded to AI by “figuring out, okay what do you want to say? How’s the best way to say it?” (P9). Notably, when these stories are generated by machines, they have value as information or as service content, but “it’s not journalism” (P8). Due to the difficulty of designing systems that can mimic journalistic creativity, the focus is set on identifying work processes that lack creativity. “Maybe we don’t even pick the fight to measure ourselves against the editorial or feature articles,” explained P6, instead targeting “everything that just consumes time.”

Journalistic value is defined as scoops, analysis, brand building, and moving away from breaking news towards investigative stories. The AI systems are viewed as partners in this process, with the ability to “sort out some sort

of meaning from all this information” (P1), augmenting and optimizing newswork. Even as the focus is on augmentation, the impact on jobs is an undercurrent. P5 points to how “it’s much harder to do investigative journalism than reporting election coverage based on tables you receive from the statistical office,” resulting in “there will be probably less people writing less, but deeper, longer articles, and highly qualified.” There are reservations regarding how optimization will be accomplished in practice, as the argument for quality requires doing things “better than before and not just cheaper” (P1).

Replacing humans is a topic the participants problematize, with P6 arguing that “they are not firing people. That’s an allegation I always face at discussions but it’s something I never see in practice [...] everybody stays because they’re already with a journalist union.” Instead, new employees that are “fit [to work] with data sources” (P6) are added. How optimization should be executed can cause friction over authority, as P8 explains how “it’s very difficult for [the journalists] because there is the part of the text [that] is not written by them, and they want to own their text,” leading to difficulties justifying why a hybrid work model “really [is] the best way to tackle a lot of information [from] a journalistic point of view.”

4.3 | The narrative: The misinterpreting newsroom

Our interviews show how the obstacles to optimizing newswork frame the narrative of news organizations as being “complicated” (P8) customers compared to other industries. Narratives are shared stories that aid in collective sensemaking and legitimizing identities (Thornton et al., 2012, p. 155). In the case of AI in newsrooms, these challenges are furthered by a shared understanding of journalists as headstrong and reluctant to give up professional authority, and viewing newsrooms as misunderstanding the technology. “The editorial team is usually not very open to these things,” explains P2, who represents a company that sells solutions for both e-commerce and news; “if you try to talk with the head of sports or like the editorial head [...] then they will not like it in general, because they don’t understand how it works.”

Convincing news organizations of the benefits of AI can run afoul “because they are always asking some kind of philosophical questions. It’s not straightforward,” explains P8. Conversely, P7 points to how other industries are much less hesitant to adopt their technology: “It’s funny. In the financial spaces, we don’t see it at all. I think numbers people hate writing.”

Misinterpretations of the technology are cited as leading to unrealistic expectations, malinvestments,

confusion, and problems with applying the technology—similar issues as other industries struggle with (Davenport & Ronanki, 2018). P5 explains the difficulty of matching reality with presuppositions:

... we talk with the people that decide business-wise first, and then we talk to journalists, and they feel like artificial intelligence is coming, and it's not entirely clear for them what should they expect, because there is this a big hype that somehow artificial intelligence will solve everything. Then, on the [one] hand, they want that, whatever that is, but on the other hand they want instant correction of errors and understanding the rules, how things work. If we tell them that there is a machine learning model and we have to retrain it, they kind of say “okay” without really fully understanding what that means.

The inexactness of what AI is, combined with hyped abstractions in the popular press, manifests in imaginary ideas of robots taking over work, which the participants view as unrealistic for now. Consequently, the metaphor “robot journalism” is viewed as problematic, even though it is frequently used, as it has become an established term for explaining a complex technology. “When I talk about robot writers, everybody understands,” says P8, “it's really difficult because a robot journalist is really an absurd term.” P3 points to how the more “conservative” the organization, the more difficult it is to bring about change. Successful implementation depends on “how digitally mature they are and how much they invest in it,” concluding that newsrooms increasingly “trust numbers over intuition. They do. But I can't say that all are great at it. That would be an overstatement” (P3).

Interestingly, the interviews reveal differences in how interactions with newswriters and access to newsrooms are managed. Whether management hinders the technologists from approaching journalists, or the technologists prefer to leave the change communication to the newsroom management, the validity of the story of the “difficult journalist” hinges on the narrative. Nonetheless, it is a through line in deciphering the competing logics of the technologists and the newsrooms.

5 | COMPETING AND ASSIMILATING LOGICS

Organizational forms that differ in how they construct their theories, frames, and narratives may find themselves

in situations of competing logics when interacting (Thornton et al., 2012, p. 161). Interacting with external logics is “critical to changes in field-level logics” (Thornton et al., 2012, p. 162), influencing both the field of journalism and the field of technology. The participants highlighted their externality, positioning themselves at the periphery of journalism, and were careful to identify as technology professionals (see Wu et al., 2019). Charting how the technologists viewed their interactions with news organizations leads us to identify instances where logics both *compete* and where dimensions of logics *assimilate*. The interviews reveal how technologists see journalism as representing a competing logic, where misalignments in attention result in failures in implementation, such as newsrooms losing focus and “doing things just because we can” (P1), or companies following newsroom requests to venture into story forms incompatible with the technology (P8).

These frictions are ascribed as a symptom of the newsroom focus on authority and autonomy. From the perspective of institutional logics this suggests that technologists *compete* with journalistic logic by applying external “pressures and powers,” as identified by Wu et al. (2019). Statements such as “It was already automated, but with a human” (P8) reveals technologists as presiding over their own knowledge domain, immersed in an “efficiency logic” (Belair-Gagnon et al., 2020) of rationalization. Journalism is perceived as different from other clients; “the thing that it automates is so different from journalism to business intelligence to marketing [...] that's why we need to address them differently [...] I mean a little gentler, and a little more explanatory” (P9). Participants expressed limiting what is explained about the AI systems, to whom it is explained, and when it is explained (e.g., Dhanorkar et al., 2021). “We describe it in human terms,” says P5, “we don't give them mathematical formulas.”

The mathematical formulas that generate news text require abstracting journalistic logic into code; not only the contextualization of what data is relevant to compare, and how those comparisons should be made, but also the linguistic structure of the stories, which then become proprietary to the service providers (Diakopoulos, 2019). “In a journalistic story, you need to tell a story,” explains P4, “you have to say, ‘what is the most important thing?’ and then we have the same journalistic rules as a journalist has.” The AI technologies enabling the production of news at the “push of a button” (P7) nudge the professional definition of newswork towards that of a specialist skill, pushing beyond what is perceived to be automatable journalistic “grunt work” (Beckett, 2019, p. 33). Journalism is recognized as a “craft” (Schapals & Porlezza, 2020), comparable to the “craftmanship” of

technologists (Passi & Jackson, 2017, p. 2444), and is moved closer to a subjective expert system of the “editorial logic,” with objective decision-making delegated to the “new knowledge logic” of AI (Gillespie, 2014, p. 192). This redefinition of newswork is ameliorated by framing the generated news as information or service content; “we [can] only describe facts, and you need more than that to be a good editor” (P4) (e.g., Carlson, 2015; Dierickx, 2019; Sirén-Heikel et al., 2019).

This interaction of logics competing for authority is combined with requirements to assimilate dimensions of journalistic logics, such as “we know our place” (P9), “we are engineers [...] not journalists” (P2). Technology companies look to embed journalistic logics into the systems; some companies have in-house journalists working with the “writing engines” (P8), whereas other take in reporters from news organizations as “topic specialists” (P4) at the start of projects. Hence, dimensions of newswork become *assimilated* into the logics of technologists through their technologies. Assimilation is a “developmental change” where “the prevailing practices and symbolic representations remain, while others change” (Thornton et al., 2012, p. 164). “It’s actually [they] who know the answers; it’s not us, because we have a different background, obviously, and we learned that the hard way,” commented P5. Technologists not only assimilate knowledge related to newswork, but the interaction with journalists also introduces other beneficial aspects, such as “that ease of use idea [...] things that would help onboarding people without an IT background” (P6), or interrogating the software from an ethical perspective, “if we weren’t working with the media industry and journalists, we wouldn’t have asked this type of question” (P8).

Technologists have their reasons for engaging in a “significant field when it comes to public perception, but [where] nobody has money” (P6). Interviewees recognize the value of working with news organizations for improving their technologies, P2 explaining how “they really helped us understand how the product, the news feeds, should look like. And that was very valuable [...] this [has helped us] move to different industries much faster”. With its strict conformity to specific norms, practices, and values—its journalistic logics—journalism is a valuable “testing ground” for benchmarking software for more lucrative domains (Carlson, 2015, p. 422).

6 | DISCUSSION AND CONCLUSIONS

In this paper, we have examined the in situ implementation of AI technologies in journalism from the perspective of the technologists. Our study contributes to a

broader understanding of the interplay between AI and work by examining the case of automated journalism, exploring the interactions that occur during the process of introducing AI technologies in newswork. As the field of journalism is grappling with disruption brought on by digitalization and datafication, innovative technologies are increasingly envisioned as solutions for improving business and attracting audiences (Beckett, 2019; Min & Fink, 2021). One facet of this development is applying natural language generation on data-rich domains, using the technology for reporting on topics such as sports, real-estate, and financial news (Lindén, 2017).

By asking our informants to describe the process of applying and designing AI technologies for creating news stories using NLG, we gleaned insights into the sensemaking that occurs when actors representing separate logics interact. Our findings add to burgeoning research emphasizing the “richer, messier design practice” that surrounds building AI systems, acknowledging the embeddedness of beliefs, values, assumptions, and interests (Dhanorkar et al., 2021, p. 1600). Applying institutional logics as a theoretical framework for analyzing how technologists discuss these interactions, we identify building blocks for a field logic based on a theory of AI as rationalizing news organization, a frame of AI optimizing newswork, and a narrative of newsrooms as misinterpreting AI, compared to other industries. We find technologists positioning themselves as outsiders, assimilating dimensions from journalism through competing with the logic of journalism, and consequently benchmarking their technologies for more lucrative domains (see Wu et al., 2019).

Our findings support the notion that AI tools do not only provide affordances for newsrooms: they are also shaped by their intended use and users through assimilation, implicating the bilateral nature of AI and work (e.g., Anderson, 2013; Carlson, 2015; Østerlund et al., 2021). As elements of newswork are drawn from the field of journalism into the field of the technologists, newsworthiness is transmuted into code and recreated as information retrieval (Carlson, 2018). We identify how the technologists view adopting AI as nudging the normative concept of what journalism *should* be (e.g., Hanitzsch & Vos, 2017) towards skills they consider valuable in journalism; reconsidering newswork as analysis, contextualization, and investigation. Defining some aspects of newswork as menial tasks corresponds to one of the facets of the Three D’s in robotics: dullness (Takayama et al., 2008). This paper is confined to the domain of journalism, yet from the perspective of a creative profession impacted by AI technologies, our results warrant further studies of other creative industries under influence to incorporate AI into their work processes. As in other

industries, expectations of AI need to be aligned with what it affords (Dhanorkar et al., 2021; Wolf & Paine, 2020).

Our study is limited by only interviewing one representative from each company. Yet considering the nature of the field, the average size of the companies involved, and the role of our participants, we argue that their views shed light on the interplay that occurs when AI technologies are incorporated into organizations. Nonetheless, this study is exploratory in nature. Companies mainly producing systems for journalism may be in a different position compared to companies focusing on the more lucrative domains, thus impacting their willingness and need to assimilate journalistic logics. Our study is asymmetrical, as the perspectives of journalists are not present in our material, yet we complement existing studies focusing on journalism and technology (e.g., Kunert, 2020; Schapals & Porlezza, 2020; Wu et al., 2019). The viewpoint from creative labor should be further examined; whether the imagined benefits of AI are indeed fulfilled, and if the normative ideals the technologists envision of enhanced quality are realized. Approaching new technologies from the perspective of logics can shed light on whether it is the technology that is transforming work, or the underlying logic.

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ENDNOTES

¹ See Diakopoulos (2019) and Stray (2019) for an overview of examples of AI in journalism.

² For an overview of a NLG process for news, see Dierickx (2021).

³ For a historical overview see Ocasio et al. (2017).

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