City Research Online

City St George's, University of London

Citation: Wilczek, B., Haim, M. & Thurman, N. (2024). Transforming the value chain of local journalism with artificial intelligence. AI Magazine, 45(2), pp. 200-211. doi: 10.1002/aaai.12174

This is the published version of the paper.

This version of the publication may differ from the final published version. To cite this item please consult the publisher's version.

Permanent repository link: https://openaccess.city.ac.uk/id/eprint/32988/

Link to published version: https://doi.org/10.1002/aaai.12174

Copyright and Reuse: Copyright and Moral Rights remain with the author(s) and/or copyright holders. Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, unless otherwise indicated, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way. For full details of reuse please refer to City Research Online policy.

City Research Online: http://openaccess.city.ac.uk/ publications@citystgeorges.ac.uk

Check for updates

Received: 31 August 2023 | Revised: 12 January 2024 | Accepted: 9 April 2024

DOI: 10.1002/aaai.12174

SPECIAL TOPIC ARTICLE

Transforming the value chain of local journalism with artificial intelligence

Bartosz Wilczek | **Mario Haim** | **Neil Thurman**

Department of Media and Communication, Ludwig Maximilians University, Munich, Germany

Correspondence
Bartosz Wilczek, Department of Media and Communication, Ludwig Maximilians University, Akademiestr. 7, 80799 Munich, Germany.
Email: bartosz.wilczek@ifkw.lmu.de

Funding information
VolkswagenStiftung, Grant/Award Number: 9B390 9B761

Abstract

With their advertising and audience revenues in decline, local news organizations have been experiencing comparatively high degrees of disruption in recent years. Artificial Intelligence (AI) offers opportunities for local news organizations to better cope with the economic challenges they face. However, local news organizations need to carefully prioritize where AI will create the most value. After all, they serve customers in the audience and advertising markets, with external effects on society. At the same time, they are limited by scarce resources, which constrains the implementation of AI. Therefore, based on Porter's value chain, this article pursues two goals. First, drawing on previous research, we provide a systematic overview of activities for which local news organizations see the biggest potential of AI to create value. Moreover, we highlight promising AI use cases based on benchmarking with national news organizations. Second, we discuss local news organizations' challenges in implementing AI and how they might overcome such obstacles.

INTRODUCTION

The rapidly advancing process of digitization is putting local news organizations under pressure. With their advertising and audience revenues in decline, local news organizations have been experiencing comparatively high degrees of disruption in recent years (Gulyas and Hess 2023). Therefore, a major challenge facing societies today lies in the decline of local news provision (Wahl-Jorgensen 2019), which threatens to create news deserts (Abernathy 2023; Blagojev et al. 2023; Olsen and Mathisen 2023), with consequences for local communities and, more broadly, for democratic societies (Ali 2016; Olsen, Kammer, and Solvoll 2020).

Here, digital transformation (Jenkins and Nielsen 2018) and particularly the use of Artificial Intelligence (AI) offer opportunities for local news organizations to better cope with the economic challenges they face (Aubin Le Quéré and Jakesch 2022; Borchardt 2022; Rinehart and Kung 2022; Tang, Qi, and Zhang 2020; Thäsler-Kordonouri and Barling 2023; Wilczek et al. 2021). AI refers, broadly speaking, to "a collection of [...] technologies [...] that relate to a computer system's capacity to perform tasks normally requiring human intelligence" (Beckett and Yaseen 2023, p. 10). AI systems can be differentiated based on two dimensions (de Zúñiga, Goyanes, and Durotoye 2023): the level of performance, which refers to an AI system's capability to perform tasks, take decisions, and make predictions, and the level of an AI system's autonomy, which is shaped by the degree of human input, interaction, and supervision. Weaker AI draws on rule-based systems, while stronger AI is based on machine

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.
© 2024 The Author(s). *AI Magazine* published by John Wiley & Sons Ltd on behalf of Association for the Advancement of Artificial Intelligence.

learning—that is, algorithms that, although programmed by humans, are designed to independently make decisions based on supplied data (Goldhammer, Dieterich, and Prien 2019).

AI can be potentially used for a wide variety of activities in local journalism (Beckett and Yaseen 2023; Diakopoulos 2019; Jamil 2021; Loosen and Solbach 2020; Thurman, Lewis, and Kunert 2021). However, as Porter (1985a) noted early on, not all technological innovation is strategically beneficial. Indeed, local news organizations need to carefully prioritize where AI will create the most value (Steering Committee on Media and Information Society of the Council of Europe 2023), considering that they serve customers in the audience and advertising markets, with external effects on society (Olsen 2021; Picard 2010). Moreover, local news organizations have scarce resources, which constrains the implementation of AI (Borchardt 2022; Wilczek et al. 2021), and the push to embrace the "bright shiny things" might leave local news organizations in perpetual cycles of innovation that will exhaust their already limited resources further (Posetti 2018).

Against this background, this article pursues two goals. First, drawing on previous research, we provide a systematic overview of activities for which local news organizations see the biggest potential in AI to create value. Moreover, we highlight promising AI use cases based on benchmarking with national news organizations. Second, we discuss the challenges local news organizations face in implementing AI and how they might overcome them. To this end, we draw on Porter's (1985b) value chain framework, data from previous research on AI in local journalism, as well as insights from industry and policy reports that relate to the implementation of AI in journalism.

Porter's value chain states that activities in organizations can be divided into two general areas, namely primary activities, which create value directly, and secondary activities, which support the primary activities. The value chain framework provides a basis to identify activities that may benefit from innovation (Chan-Olmsted 2019) and is, therefore, particularly useful for the present analysis.

This article is structured as follows: First, we outline Porter's (1985b) value chain framework in the context of local journalism and AI. Second, we examine the potential of AI for local news organizations' primary activities in the value chain. Third, we discuss how local news organizations' secondary activities might constrain the implementation of AI and how local news organizations might overcome such obstacles.

The value chain in the context of local journalism and AI

The value chain consists of activities that organizations perform to create value for their customers (Porter 1985b). Local news organizations create value by providing news to audiences in the audience market and the attention of these audiences to advertisers in the advertising market. This is the two-sided market model, which is typical for commercial local news organizations (Picard 2010).

However, local news organizations have been struggling to create value for which audiences are willing to sacrifice nonmonetary (time, effort) and monetary costs (Van der Haar, Kemp, and Omta 2001), resulting in declining revenues in their two-sided market (Gulyas and Hess 2023). For instance, Olsen and Solvoll (2018a) have found that local news organizations' offerings are particularly misaligned with younger and lower-income audiences. Furthermore, bringing a product to the market with high (potential) customer value alone is no guarantee of profits, as customers make decisions based on a choice between competing offers (Van der Haar, Kemp, and Omta 2001). Indeed, local news organizations have been also struggling to remain relevant to local audiences as alternative information sources are gaining importance in local communities, including on social media (Newman et al. 2020).

The value commercial local news organizations create for their customers can have positive and negative external effects on society (Von Rimscha and Siegert 2015). Local news has positive external effects if it "contributes to a better-informed citizenry" (Olsen 2021, p. 810), which is generally regarded as a prerequisite for a well-functioning democracy. However, local news has negative external effects if it constrains the functioning of a democratic society, for instance by spreading misinformation in local media environments (Zilic Fiser and Caks 2023).

Porter (1985b) differentiates two types of activities that create value, namely primary and secondary activities. *Primary activities* create value directly, that is, products pass through a sequence of activities, and each activity adds value to the products. In his value chain framework, Porter (1985b) distinguishes five core areas of primary activities. *Inbound logistics* refer to activities such as acquiring, managing, and storing inputs. *Operations* refer to activities that transform inputs into products. *Outbound logistics* refer to activities that deliver products to the end users. In local journalism, these three activity areas relate to news gathering, news production, and news distribution (Rinehart and Kung 2022). Moreover, according to Porter (1985b), *marketing and sales* refer to activities that facilitate the purchase of the products such as advertising and pric-

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

ing. Finally, *service* relates to activities offered after the products have been sold and delivered such as customer service. Regarding local journalism, Rinehart and Kung (2022) subsume these two activity areas under business operations.

AI can contribute directly to local news organizations' value creation in two ways. First, AI can be applied to facilitate "increased efficiency and cost reduction" (Åström, Reim, and Parida 2022, p. 2114). Here, the goal is to improve and refine already existing primary activities with AI, for instance by reducing repetitive work tasks. Hence, according to Åström, Reim, and Parida (2022), the output will be the same and customers will not witness any revolutionary changes in the perceived value. Indeed, as Beckett (2019) has found, two thirds of the 71 surveyed news organizations (i.e., newspapers, broadcasters, publishing groups, news agencies, magazines, and other types of media) in 32 countries aimed to use AI to make journalists' work more efficient. However, AI can be also applied to facilitate "revenue and growth" (Åström, Reim, and Parida 2022, p. 2114). Here, the goal is to support primary activities and improve outcomes by drawing on AI's capability to "solve complex problems" (Åström, Reim, and Parida 2022, p. 2115). For instance, Beckett (2019) has found that almost half of the surveyed news organizations aimed to use AI to deliver more relevant content to users, which, in turn, may increase audience engagement and ultimately revenues. Depending on whether local news organizations will apply AI responsibly or not (Helberger 2024; Reporters Without Borders 2023), the use of AI could have positive or negative external effects on society.

Secondary activities create value indirectly in that they support the primary activities. Porter (1985b) distinguishes four core secondary activities. *Infrastructure* refers to the support system that allows organizations to maintain their operations and includes accounting, legal, and general management functions. *Human resource management* refers to activities that recruit, train, develop, and manage personnel. *Technology* refers to research and development activities that design products and improve processes. Finally, *procurement* refers to activities regarding the acquisition of inputs and resources. These secondary activities of local news organizations shape the implementation of AI in the primary activities of the value chain.

Previous communications research has devoted significant attention to value creation in journalism, considering national (e.g., Picard 2006) as well as regional (e.g., Graham and Hill, 2009) and local (e.g., Olsen 2021) news organizations. The first and, so far, only analysis of how the media industry adopts AI along Porter's (1985b) value chain was put forward by Chan-Olmsted (2019). The author focused on the use of AI for primary activities and explored this based on a diverse sample of news organizations (newspapers, radio, TV) as well as technology companies. However, the value chain has not yet been applied to analyze AI in the context of local news organizations specifically, considering how their primary activities may benefit from AI use and how their secondary activities may shape the implementation of AI.

AI and primary activities of local news organizations

While AI in journalism is a rapidly growing field of research, only recently have scholars begun to investigate AI in local journalism specifically. In doing so, they have put a particular focus on investigating the future potential of AI (Aubin Le Quéré and Jakesch 2022; Lehmann and Förtsch 2023; Rinehart and Kung 2022; Wilczek et al. 2021, 2022). So far, the most comprehensive overview of AI use cases for local news organizations has been published by Rinehart and Kung (2022). Based on 135 scorecards submitted by news managers of local news organizations (print, radio, TV, digital only) in the United States, the authors compiled an "automation wish list" (p. 50) of 117 AI-related activities.

To examine local news organizations' perceptions regarding the potential of AI for their primary activities in the value chain, we take this automation wish list as the baseline and contextualize the results with further international research findings. Moreover, we highlight promising AI application areas based on benchmarking with national news organizations, considering the rapidly advancing developments in the field of generative AI. To this end, we transformed the automation wish list in three ways: First, we removed nine activities that were not sufficiently specified (e.g., "analytics [unclear what type]") and 10 activities that do not relate to primary activities (e.g., "real estate transactions"). Second, we combined 46 activities into 14 activity areas (e.g., we combined automated news coverage of "high school sports," "college sports," "minor league sports," "government," "elections," "agriculture," and "weather" into one activity area). This resulted in 66 AI use cases. Third, we assigned these use cases to the corresponding primary activities of local news organizations' value chains.

As presented in Figure 1, the US local news organizations identified the biggest potential of AI to create value regarding operations (238 mentions, 21 activities), followed by inbound logistics (168 mentions, 18 activities), outbound logistics (126 mentions, 11 activities), marketing and sales (80 mentions, 12 activities), and service (48 mentions, 4 activities).

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

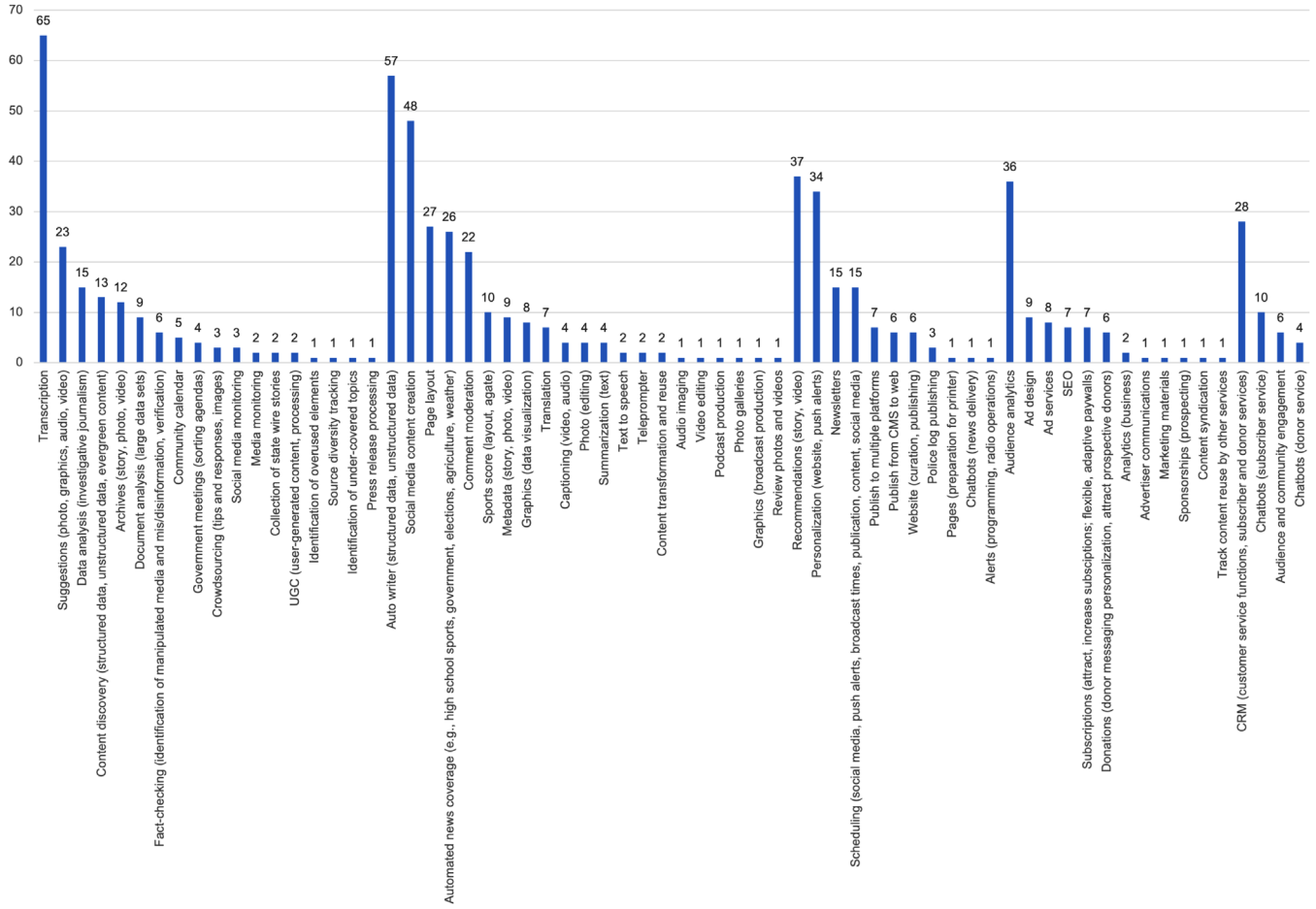

FIGURE 1 AI use cases for primary activities along the value chain of local journalism. *Source*: The chart draws on data from the "Artificial Intelligence in Local News" report (Rinehart and Kung 2022).

AI for activities regarding inbound logistics

The US local news organizations (Rinehart and Kung 2022) identified 18 activities regarding inbound logistics where AI could create value (Figure 1). Transcription was the by far most often mentioned activity ($n = 65$). Of course, here, AI can create value by reducing the workload of journalists and thus saving costs. Moreover, the relatively often identified activities of data analysis (investigative journalism) ($n = 15$), content discovery (structured data, unstructured data, evergreen content) ($n = 13$), and document analysis (large data sets) ($n = 9$) indicate the potential of AI to create value by enabling local journalists not only to streamline data-based reporting (Aubin Le Quéré and Jakesch 2022) and save costs in investigative journalism (Stray 2019) but also to detect newsworthy events on social media (Thurman 2018) and discover original public affairs stories (Broussard 2015). Such AI-driven activities may optimize news reporting and lead to increased audience engagement and revenues. Indeed, findings from a survey with 31 local news organizations in Switzerland (Wilczek et al. 2021) and from in-depth interviews with editorial as well as product and technology experts in 14 local news organizations in Germany (Wilczek et al. 2022) also suggest that AI-driven data analysis may become increasingly relevant in local journalism.

Fact-checking (e.g., identification of mis- and disinformation, verification) ($n = 6$) was only rarely mentioned by the US local news organizations (Rinehart and Kung 2022), while receiving increasing academic attention. For example, Beckett and Yaseen (2023) conclude based on a survey with 105 news and media organizations (i.e., newspapers, broadcasters, publishing groups, news agencies, magazines, and other types of media) from 46 countries that AI may become highly relevant for journalistic fact-checking. After all, journalists are "challenged by the time pressure that subtends the urgency of media coverage and by information disorders that spread faster online than verified facts" (Dierickx and Lindén 2023, p. 1).

Accordingly, AI can create value by speeding up the fact-checking process (Dierickx, Lindén, and Opdahl 2023) and enabling local news organizations to report accurately and

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

faster in breaking news situations, thereby upholding trust and credibility among their audiences (Zilic Fiser and Caks 2023). This too has the potential to increase (or at least to maintain) audience engagement and revenues. According to Graves (2018), AI can assist journalists during three steps of the fact-checking process. First, AI can make it easier to verify information, such as by evaluating sources. One example was the "Truthmeter" developed as part of an international EU project. This tool was designed to help journalists assess the credibility of sources on social media (Fletcher, Schifferes, and Thurman 2020). Second, AI can be used in the verification process directly, such as by comparing information with other sources. The UK-based fact-checking organization *Full Fact* has developed a tool of this type (Full Fact 2022). Third, AI can be used for corrective purposes, such as by flagging incorrect information. A tool of this type was developed at the University of Waterloo, Canada. It reviews online posts and highlights "fake news" (University of Waterloo 2019). Meanwhile, international communities such as the *European Digital Media Observatory* are pooling resources to leverage the potential of AI for fact-checking.

AI for activities regarding operations

The US local news organizations (Rinehart and Kung 2022) identified 21 activities regarding operations where AI could create value (Figure 1). Automated writing (based on structured and unstructured data) ($n = 57$) was the most often mentioned activity. Together with the closely related and relatively often identified activity of automated news coverage (e.g., high school sports, government, elections, agriculture, weather) ($n = 26$), this activity area indicates the potential of AI to create not only textual but also multimodal value by saving costs in news production. Findings from Switzerland (Wilczek et al. 2021) and Germany (Wilczek et al. 2022) confirm the increasing relevance of automated content production for local journalism.

After all, budget cuts in local news organizations have a particularly severe impact on people (Olsen and Mathisen 2023). This places an increasing challenge on local news organizations to make optimal use of their (remaining) workforce. Considering this, local news organizations may intensify a process of labor division, with journalists focusing on activities where they create the most value, namely producing exclusive content, such as scoops (Haim, Graefe, and Brosius 2018), while AI may be used to perform routine tasks (Aubin Le Quéré and Jakesch 2022). So far, such a division of work has pertained to journalistic text production particularly. Automated text generation has been predominantly used regarding standardized news reports for which AI systems can use up-to-date data in a rule-bound process (Haim and Graefe 2018; Lindén and Tuulonen 2019; Thurman, Dörr, and Kunert 2017).

With the rise of generative AI (Henriksson 2023; Nishal and Diakopoulos 2023), significantly more sophisticated AI tools are now available with the ability to automatically generate not only standard texts but also more complex reports. Large language models (LLMs) such as GPT (by OpenAI), BLOOM (by BigScience), LaMDA (by Google), and LLaMA (by Meta) are capable of generating texts at a high linguistic level on any given topic. Indeed, as Beckett and Yaseen (2023) have found, most of the 105 surveyed news organizations are experimenting with generative AI.

In addition to its use for text production, AI is also becoming increasingly relevant to automatically generate multimedia content (Goldhammer, Dieterich, and Prien 2019). According to Thurman, Stares, and Koliska (2024), news organizations "including the BBC, Reuters, and The Economist have turned to video automation services provided by companies such as Wibbitz, Wochit, and Synthesia" (p. 2). Moreover, large vision models (LVMs) such as Dall-E (by OpenAI), Imagen (by Google), or Stable Diffusion (by Stability AI), which allow the generation of imagery from textual prompts, have recently received a lot of attention. Only a few US local news organizations (Rinehart and Kung 2022) identified the potential of AI regarding the generation of graphics ($n = 9$).

Only a few US local news organizations (Rinehart and Kung 2022) also recognized the potential of AI to automate content modification, for instance, to summarize text ($n = 4$), transform text to speech ($n = 2$) or, more broadly, to transform and reuse content ($n = 2$). However, as Beckett and Yaseen (2023) have found, particularly AI-driven text summarization may become increasingly relevant in journalism to automatically tailor content for different distribution channels. Another example of automated content modification is the A/B testing of headlines: "Using such approaches, digital newsrooms might audience-test as many as a dozen headlines per article, collecting data that allows an optimization algorithm to converge on the headline that is best with respect to some metric" (Hagar and Diakopoulos 2019, p. 117).

However, whether the use of AI for news production will create value beyond cost reduction by also increasing local news organizations' revenues will depend on local audiences' willingness to engage with and pay for content that is produced or modified with AI. Based on a representative survey of citizens in the German- and French-speaking parts of Switzerland, Vogler and colleagues (2023) have found that only 21% of the respondents are willing to use AI-generated "local" and "regional" news, while 61% are willing to use "routine news" (e.g., weather, stock exchange) that is generated with AI.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

AI for activities regarding outbound logistics

The US local news organizations (Rinehart and Kung 2022) identified 11 activities regarding outbound logistics where AI could create value (Figure 1). The two most often identified and related activities of recommendation (story, video) ($n = 37$) and personalization (website, push alerts) ($n = 34$) highlight the potential of AI to create value by adjusting content delivery according to their audiences' needs (Olsen 2021), thereby increasing audience engagement (Borchardt 2022). In fact, according to local news organizations in Switzerland (Wilczek et al. 2021) and Germany (Wilczek et al. 2022), personalized distribution of content is the most relevant AI use case.

Yet, as Pourashraf and Mobasher (2022) state, using standard machine learning models may not be appropriate for local news organizations. The focus of such models on long-term high-level preferences may, in fact, result in taking attention away from local stories that help provide the distinguishing added value for local news outlets (p. 80). For instance, local audience members may not be interested in sports generally; however, they may have an interest in the local high school team. Therefore, according to Pourashraf and Mobasher (2022), such AI systems must combine long-term high-level preferences with localized models to help increase audience engagement with local news.

AI-driven personalized content distribution can be used for different channels, such as newsletters, news apps, and, of course, news websites (Beckett and Yaseen 2023; Borchardt 2022; Lindén and Tuulonen 2019). In March 2022, *The New York Times* launched a team composed of journalists and product developers to optimize personalized content distribution on its homepage: "With input from desks and product teams, they will test myriad hypotheses, with a focus on engaging our subscribers and getting them to come back to us more frequently. These experiments will include things like targeting readers based on location or reading history or testing new kinds of content packages" (Skog and Withrow 2022). Such experiments may also help local news organizations to optimize their personalized content distribution.

AI for activities regarding marketing and sales

Regarding marketing and sales, the US local news organizations (Rinehart and Kung 2022) identified 12 activities where AI could create value (Figure 1). The by far most often identified activity relates to audience analytics ($n = 36$), which turns raw digital data into usable information that allows journalists to make strategic decisions. After all, "[w]hat users do with content—measured as engagement, shares, comments, pageviews, and time on page—can help inform content strategy" (Beckett 2019, p. 29). Audience analytics can also help local news organizations create a baseline for other activities such as personalizing content distribution, advertising, and paywalls (Rinehart and Kung 2022).

The further identified activities regarding advertisement design ($n = 9$), advertisement services ($n = 8$), and advertiser communications ($n = 1$) on the one hand, and regarding subscriptions (attract, increase subscriptions; flexible, adaptive paywalls; $n = 7$) and donations (donor messaging personalization, prospective donors; $n = 6$) on the other hand (Rinehart and Kung 2022) indicate the potential of AI to create value by increasing advertising and audience revenues. As advertising revenues are often far from sufficient to finance local journalism (Olsen 2021; Sjøvaag and Owren 2021), local news organizations are becoming increasingly reliant on revenues from the audience side of the two-sided market (Buschow and Wellbrock 2019; Hansen et al. 2018; Olsen and Solvoll 2018b).

This is where AI-driven dynamic paywalls may come into play (Piechota 2022). These systems operate on the basic principle of measuring the user behavior of potential subscribers before personalizing the paywall. Dynamic paywalls "can automatically alter article limits and even deliver personalized subscription pitches based on readers' consumption habits" (Kalim 2021). *The Wall Street Journal* was among the first news organizations to implement a dynamic paywall (Wang 2018). The AI system draws on an array of user data—including how often users access content, via which channels, and which content particularly interests them (Kalim 2021). This data is then used to calculate the propensity score, that is, the probability that users will take out a digital subscription. The AI system then individualizes the number and type of articles each user can access for free before the paywall comes into effect.

AI for activities regarding service

Finally, regarding service, the US local news organizations (Rinehart and Kung 2022) identified 4 activities where AI could create value (Figure 1). Customer service management was mentioned most often ($n = 28$). Together with the relatively often identified chatbots for subscribers ($n = 10$) and donor services ($n = 4$), this activity area indicates local news organizations' need to automate routine service inquiries.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Of course, chatbots have already found a place in news organizations, as they seek to attract new audiences using conversational forms of journalism (Jones and Jones 2019). While chatbots for news delivery (outbound logistics) were mentioned by only one US local news organization (Rinehart and Kung 2022), they have been used by major news organizations to distribute journalistic content (Jones and Jones 2019). The US news agency *Associated Press* was among the first news organizations to implement such a chatbot (Dörr 2015). *The Guardian* also deployed a similar application at an early stage, as Veglis and Maniou (2019) detail: Another initiative of [The] Guardian was the introduction of a chatbot that communicates with users through Facebook Messenger, by sending them news [briefings] every morning with the top news stories (p. 3). However, Beckett and Yaseen (2023) have found that chatbots to conduct preliminary interviews and gauge public sentiment (inbound logistics) may become particularly relevant in the future.

AI and secondary activities of local news organizations

While local news organizations identify primary activities where AI could create value, they face challenges regarding the implementation of AI tools. Therefore, in the following section, we discuss how local news organizations' secondary activities might constrain the implementation of AI and how local news organizations might overcome such obstacles, starting with the most pressing activity area, namely technology.

AI and activities related to technology

To ensure that AI creates the most value, local news organizations need to develop a strategic approach to AI adoption. As the Steering Committee on Media and Information Society of the Council of Europe (2023) argues in its guidelines on the responsible implementation of AI systems in journalism, the AI strategy of a news organization needs "to be embedded within a broader vision of what the news organization hopes to achieve, its business model, the challenges it faces, the democratic role of the media [. . .], and the role of technology in reach" (p. 5).

However, according to Beckett and Yaseen (2023), only one third of the respondents said that their news organization had an AI strategy or was currently developing one. A lack of resources is a reason for the absence of an AI strategy, a constraint that will affect local news organizations particularly. Indeed, Rinehart and Kung (2022) have found that most of the surveyed US local news organizations do not have an AI strategy yet that crosses all departments and that they "expressed concern that [. . .] [they] are unprepared for AI adoption" (p. 14).

The development of an AI strategy involves not only the definition of an AI vision but also the identification and prioritization of AI use cases (UnternehmerTUM 2020). Beckett and Yaseen (2023) have found that innovation/digital teams, dedicated cross-functional teams, tech/IT departments, or data teams oversee the development of AI strategies in their news organizations. These are specialized units (Cools, Van Gorp, and Opgenhaffen 2022; Kosterich and Royal 2024; Sirén-Heikel, Kjellman, and Lindén 2023), which many local news organizations will not be able to implement. Nevertheless, local news organizations should at least appoint a specialist to monitor AI developments internally and externally and "keep a conversation going within [. . .] [the] organization about AI" (Beckett & Yaseen, 2023, p. 72).

AI and activities related to infrastructure

Moreover, the development of an AI strategy involves a systematic risk assessment in terms of regulation and ethics (Steering Committee on Media and Information Society of the Council of Europe 2023; UnternehmerTUM 2020). To ensure that the use of AI will have positive external effects on society, scholars and industry experts are arguing for a responsible use of AI in journalism (Helberger 2024; Komatsu et al. 2020). This means, first of all, to ensure that AI in local journalism complies with the law. As the EU AI Act has shown (Porlezza 2023), the development of such laws takes time, creating uncertainty—also among local news organizations (Lehmann and Förtsch 2023). Therefore, knowledge regarding what is legally possible to automate needs to be constantly updated (Steering Committee on Media and Information Society of the Council of Europe 2023).

However, responsible AI should not only comply with the law but also adhere to ethical standards. Lehmann and Förtsch (2023) have found that local news organizations in Germany express ethical concerns regarding the use of AI. Beckett and Yaseen (2023) also acknowledge this challenge: "For journalists, the central question is, how do we integrate AI technologies in journalism while upholding journalistic values like accuracy, fairness, accountability, and transparency" (p. 39). To provide orientation, news organizations (Becker, Simon, and Crum 2023), journalism associations (Deutscher Journalisten-Verband 2023), and international journalism organizations such as *Reporters Without Borders* (2023) have set out to develop ethical guidelines for AI.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

After all, ethical considerations relate to all AI use cases along local news organizations' value chains. For instance, AI-driven data analysis (inbound logistics) bears risks, including in terms of accuracy. To perform accurately, AI systems need to draw on high-quality data (Fridman, Krøvel, and Palumbo 2023) and they need to be trained accordingly (Wilczek et al. 2022). Risks in terms of accuracy also relate to automated content production (operations), as generative AI tends to "make up facts ('hallucinations')" (Beckett and Yaseen 2023, p. 57). Only careful fact-checking will mitigate such risks. The personalized distribution of content (outbound logistics) bears the risk of undermining a shared understanding of relevant facts and viewpoints among audience members. Therefore, Helberger, Karpinnen, and D'Acunto (2018) argue that such AI systems should be designed "to stimulate more diverse exposure to information" (p. 191). Dynamic paywalls (marketing and sales) may create inequalities in terms of access to information. Here, the question arises about which information should be provided for free and under what conditions (Saltz 2020). Finally, chatbots (service) may exert biased behavior based on the data they are given. To avoid bias, chatbots need access to larger amounts of data, from multiple viewpoints and environments (Carter 2023).

AI and activities related to human resources

The development of an AI strategy involves make-or-buy decisions, that is, whether to develop AI applications in-house or to acquire them from external providers (UnternehmerTUM 2020). To involve journalists and/or audience members in the co-creation of AI applications and tailor AI tools according to their specific needs (Portugal et al. 2023), local news organizations may choose to develop AI applications themselves (Aubin Le Quéré and Jakesch 2022). Due to their limited resources, many will rely on support, which can be financial and, depending on the media market, provided by the state (Konieczna 2020), by platforms such as Google and Facebook (Fanta and Dachwitz 2020), or by philanthropic initiatives (Aubin Le Quéré and Jakesch 2022). However, it is an open question whether such support will constrain journalistic independence and whether it will be sustainable (Aubin Le Quéré and Jakesch 2022; Wilczek et al. 2022).

In fact, Wilczek et al. (2022) have found that local news organizations in Germany are particularly interested in nonfinancial support, that is, in collaborations with academic institutions, media labs, and public broadcasters to facilitate the implementation of AI. They are also interested in education and training, as offered, for instance, by journalism schools. Beckett and Yaseen (2023) also found that most of the news organizations they investigated "welcomed a stronger role being played by universities, journalism schools, and other intermediary companies in assisting with the adoption of AI in newsrooms through research, training, and collaboration" (p. 47).

AI and activities related to procurement

Finally, local news organizations' limited resources may constrain their options for acquiring AI applications from external providers (Aubin Le Quéré and Jakesch 2022), which can include subscribing or paying for access to remote AI systems. However, if they decide to do so, strategic considerations regarding AI procurement need to be made (UnternehmerTUM 2020). After all, "AI reshapes the dependency of publishers on platform companies by increasing their control over technological infrastructure, exacerbating existing dependencies in distribution, and introducing new dependencies in production, especially as generative AI is making inroads" (Simon 2023, p. 16). National news organizations are likely to be in a better position to maintain some independence than local news organizations.

Against this background, the Steering Committee on Media and Information Society of the Council of Europe (2023) developed a checklist for assessing the suitability of a particular provider and scrutinizing the fairness of procurement contracts. This checklist considers issues ranging from the quality of the training data and the quality of the AI model to pricing and mutual support.

CONCLUSIONS

With advertising and audience revenues in decline, local journalism has been experiencing comparatively high degrees of disruption in recent years. This is creating news deserts in the United States (Abernathy 2023) and Europe (Blagojev et al. 2023). Revitalizing local journalism is crucial as it plays a relevant role in democratic societies, first and foremost by providing local information that is under-represented or absent in national news coverage and, thereby, contributing to a "better-informed citizenry" (Olsen 2021, p. 810) in local communities.

AI offers opportunities for local news organizations to better cope with the economic challenges they face. However, the portfolio of possible AI use cases is wide—and with the rapid development of AI technologies, fast expanding. Therefore, instead of chasing "bright shiny things" (Posetti 2018) and trying to adopt everything, everywhere all at once, which will exhaust their already limited

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

resources further, local news organizations need to carefully prioritize for which primary activities AI will create the most value (Steering Committee on Media and Information Society of the Council of Europe 2023), evaluate the feasibility of AI implementation (UnternehmerTUM 2020), and integrate AI throughout their value chain incrementally (Wilczek et al. 2022).

To examine local news organizations' perceptions regarding the potential of AI for their primary activities of the value chain, we used data from the US "Artificial Intelligence in Local News" report (Rinehart and Kung 2022) as the baseline and contextualized the results with further international research findings. In sum, the findings show that the investigated US local news organizations identify the biggest potential of AI to create value regarding operations, followed by inbound logistics, outbound logistics, marketing and sales, and service.

More specifically, in terms of operations, they see the biggest potential of AI regarding the production of news content. This is not surprising. Here, AI can create value by reducing costs and facilitating the reallocation of human resources away from routine tasks. However, whether AI will also create value by increasing revenues will depend on local audiences' willingness to engage with and pay for local news that is produced with AI (Vogler et al. 2023). While findings from Switzerland (Wilczek et al. 2021) and Germany (Wilczek et al. 2022) confirm the increasing relevance of automated content production for local journalism, the Swiss and German local news organizations investigated identify the biggest potential of AI regarding outbound logistics, that is, the personalized distribution of content. Here, AI can create value by adjusting content delivery according to local audiences' needs, thereby potentially increasing audience engagement and ultimately revenues. As highlighted in this article, there are further promising primary activities where AI may create value for local news organizations beyond cost reduction, particularly data analytics (inbound logistics) and dynamic paywalls (marketing and sales).

However, everything needs to start with the development of an AI strategy, which requires local news organizations to define their AI vision. The development of an AI strategy also involves a systematic risk assessment in terms of regulation and ethics. Indeed, to ensure that the use of AI will have positive external effects on society, scholars and industry experts are arguing for a responsible use of AI in journalism. To facilitate the adoption of AI, local news organizations may foster collaborations, for instance with academic institutions. And to reduce their dependence on external providers, local news organizations need to make strategic decisions in terms of the procurement of AI technologies.

AI technologies are rapidly evolving—and so may local news organizations' priorities in terms of AI. Accordingly, this article reflects a preliminary status. Further research is needed to monitor how local news organizations will adopt AI for their primary activities in the value chain—preferably from a global perspective. Most importantly, local news organizations need to adjust their secondary activities in the value chain in terms of technology, infrastructure, human resources, and procurement to support the adoption of AI. Therefore, this article also discussed local news organizations' challenges in implementing AI and how local news organizations might overcome such obstacles. Future research needs to closely examine how local news organizations will reinvent their innovation management capabilities in the age of AI.

ACKNOWLEDGMENTS

This research is funded by the *VolkswagenStiftung* under the "Artificial Intelligence and the Society of the Future" program. VolkswagenStiftung: "Artificial Intelligence and the Society of the Future". Grant Numbers: 9B390, 9B761.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict.

ORCID

Bartosz Wilczek https://orcid.org/0000-0001-7945-8441
Mario Haim https://orcid.org/0000-0002-0643-2299
Neil Thurman https://orcid.org/0000-0003-3909-9565

REFERENCES

Abernathy, P. M. 2023. "The State of Local News." *Local News Initiative*, November 16, 2023. https://localnewsinitiative.northwestern.edu/projects/state-of-local-news/2023/report/.

Ali, C. 2016. "The Merits of Merit Goods: Local Journalism and Public Policy in a Time of Austerity." *Journal of Information Policy* 6: 105–28.

Åström, J., W. Reim, and V. Parida. 2022. "Value Creation and Value Capture for AI Business Model Innovation: A Three-phase Process Framework." *Review of Managerial Science* 16: 2111–33.

Aubin Le Quéré, M., and M. Jakesch. 2022. *Trust in AI in Under-resourced Environments: Lessons from Local Journalism. In CHI '22: Workshop on Trust and Reliance in AI-Human Teams*. New York, NY: ACM.

Becker, K. B., F. M. Simon, and C. Crum. 2023. "Policies in Parallel? A Comparative Study of Journalistic AI Policies in 52 Global News Organizations [Preprint]." *SocArXiv*, September 7, 2023. https://doi.org/10.31235/osf.io/c4af9

Beckett, C. 2019. "New Powers, New Responsibilities. A Global Survey of Journalism and Artificial Intelligence." *LSE Report*, November 18, 2019.

Beckett, C., and M. Yaseen. 2023. "Generating Change: A Global Survey of What News Organizations Are Doing With AI." *LSE Report*, June 26, 2023.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Blagojev, T., D. Borges, E. Brogi, J. Kermer, M. Trevisan, and S. Verza. 2023. News Deserts in Europe: Assessing Risks for Local and Community Media in the 27 EU Member States. Centre for Media Pluralism and Media Freedom, European University Institute. July 2023. https://cadmus.eui.eu/bitstream/handle/1814/75762/News_deserts_in_Europe_2023_TR.pdf?sequence=1&isAllowed=y.

Borchardt. 2022. "Go, Robot, Go! The Value and Challenges of Artificial Intelligence for Local Journalism." *Digital Journalism* 10(10): 1919–24.

Broussard, M. 2015. "Artificial Intelligence for Investigative Reporting. Using an Expert System to Enhance Journalists' Ability to Discover Original Public Affairs Stories." *Digital Journalism* 3(6): 814–31.

Buschow, C., and C. Wellbrock. 2019. "*Money for Nothing and Content for Free? Z"ahlungsbereitschaft für digitaljournalistische Inhalte [Willingness to Pay for Digital Journalism Content]*. Landesanstalt für Medien NRW.

Carter, R. 2023. "Conversational Bias Exists. Don't Let it Poison Your Bot!." *CX Today*, June 6, 2023. https://www.cxtoday.com/wfo/conversational-ai-bias-exists-dont-let-it-poison-your-bot/.

Chan-Olmsted, S. M. 2019. "A Review of Artificial Intelligence Adoptions in the Media Industry." *International Journal on Media Management* 21(34): 193–215.

Cools, H., B. Van Gorp, and M. Opgenhaffen. 2022. "News Organizations, Different Journalistic Roles, and Innovative Projects: How Second-generation Newsroom Innovation Labs are Changing the News Ecosystem." *Journalism Practice* 2022: 1–16. https://doi.org/10.1080/17512786.2022.2097940.

Deutscher Journalisten-Verband 2023. Positionspapier bezüglich des Einsatzes Künstlicher Intelligenz im Journalismus. [Position Paper on the Use of Artificial Intelligence in Journalism]. https://www.djv.de/fileadmin/user_upload/INFOS/Themen/Medienpolitik/DJV-Positionspapier_KI_2023-04.pdf.

de Zúñiga, H. G., M. Goyanes, and T. Durotoye. 2023. "A Scholarly Definition of Artificial Intelligence (AI): Advancing AI as a Conceptual Framework in Communication Research." *Political Communication* 41(2): 317–34. https://doi.org/10.1080/10584609.2023.2290497.

Diakopoulos, N. 2019. *Automating the News: How Algorithms are Rewriting the Media*. Cambridge, MA: Harvard University Press.

Dierickx, L., and C.-G. Lindén. 2023. "Journalism and Fact-checking Technologies: Understanding User Needs." *Communication+1* 10(1): 1–27.

Dierickx, L., C.-G. Lindén, and A. L. Opdahl. 2023. "Automated Fact-Checking to Support Professional Practices: Systematic Literature Review and Meta-Analyis." *International Journal of Communication* 17: 5170–90.

Dörr, K. 2015. "Mapping the Field of Algorithmic Journalism." *Digital Journalism* 4(6): 700–722.

Fanta, A., and I. Dachwitz. 2020. "Google, the Media Patron." *How the Digital Giant Ensnares Journalism. Frankfurt am Main: OBS-Arbeitsheft* 103: 1–128.

Fletcher, R., S. Schifferes, and N. Thurman. 2020. "Building the 'Truthmeter': Training Algorithms to Help Journalists Assess the Credibility of Social Media Sources." *Convergence: The International Journal of Research into New Media Technologies* 26(1): 19–34.

Fridman, M., R. Krøvel, and F. Palumbo. 2023. "How (not to) Run an AI Project in Investigative Journalism." *Journalism Practice*: 1–18. https://www.tandfonline.com/doi/full/10.1080/17512786.2023.2253797.

Full Fact. 2022. Automated Fact-Checking. https://fullfact.org/about/automated/.

Goldhammer, K., K. Dieterich, and T. Prien. 2019. *Künstliche Intelligenz, Medien und Öffentlichkeit [Artificial Intelligence, Media and the Public Sphere]*. Berlin: Goldmedia.

Graham, G., and J. Hill 2009. "The Regional Newspaper Industry Value Chain in the Digital Age." *OR Insight* 22: 165–83.

Graves, L. 2018. *Understanding the Promise and Limits of Automated Fact-Checking*. Oxford , UK: Reuters Institute for The Study of Journalism, University of Oxford.

Gulyas, A., and K. Hess. 2023. "The Three 'Cs' of Digital Local Journalism: Community, Commitment and Continuity." *Digital Journalism* 12(1): 6–12. https://doi.org/10.1080/21670811.2023.2211639

Hagar, N., and N. Diakopoulos 2019. "Optimizing Content with A/B Headline Testing: Changing Newsroom Practices." *Media and Communication* 7(1): 117–27.

Haim, M., and A. Graefe. 2018. "Automatisierter Journalismus: Anwendungsbereiche, Formen und Qualität." In *Automated Journalism: Applications, Forms, and Quality*, edited by C. Nuernbergk, 139–60. Wiesbaden: Springer Fachmedien: Journalismus im Internet. [Journalism in the Internet].

Haim, M., A. Graefe, and H.-B. Brosius. 2018. "Ansatzpunkte für die Veränderung von Geschäftsmodellen durch Computational Journalism." *[Starting Points for Changing Business Models with Computational Journalism]*. MedienWirtschaft, 15(3): 36–42.

Hansen, E., E. Roseman, M. Spector, and J. Lichterman. 2018. *Business Models for Local News: A Field Scan*. Cambridge, MA: Shorenstein Center on Media Politics and Public Policy, Harvard University.

Helberger, N. 2024. "FutureNewsCorp, or How the AI Act Changed the Future of News." *Computer Law & Security Review* 52: 105915. https://doi.org/10.1016/j.clsr.2023.105915.

Helberger, N., K. Karpinnen, and L. D'Acunto. 2018. "Exposure Diversity as a Design Principle for Recommender Systems." *Information, Communication & Society* 21(2): 191–207.

Henriksson, T. 2023. "New Survey Finds Half of Newsrooms Use Generative AI Tools; Only 20% Have Guidelines in Place." *WAN-INFRA*, May 25, 2023. https://wan-ifra.org/2023/05/new-genai-survey/.

Jamil, S. 2021. "Artificial Intelligence and Journalistic Practice: The Crossroads of Obstacles and Opportunities for the Pakistani Journalists." *Journalism Practice* 15(10): 1400–1422.

Jenkins, J., and R. K. Nielsen. 2018. *The Digital Transition of Local News*. Oxford, UK: Reuters Institute for the Study of Journalism, University of Oxford.

Jones, B., and R. Jones. 2019. "Public Service Chatbots: Automating Conversation with BBC News." *Digital Journalism* 7(8): 1032–53.

Kalim, F. 2021. Paywalls for Publishers. Insight Report. What's New in Publishing (WNIP).

Komatsu, T., M. Gutierrez Lopez, S. Makri, C. Porlezza, G. Cooper, A. MacFarlane, and S. Missaoui. 2020. "AI Should Embody Our Values: Investigating Journalistic Values to Inform AI Technology Design, Art. No. 11." In Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society, Estonia, October 25–29, 2020. ACM.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Konieczna, M. 2020. "Entrepreneurship Versus Philanthropy: Can the Market Fund Innovation in the News Sector?" *Journal of Media Business Studies* 17(2): 132–147.

Kosterich, A., and C. Royal. 2024. "Institutional Arbitrageurs: The Role of Product Managers as a Locus of Change in Journalism." *Media and Communication* (12): 1–18. https://doi.org/10.17645/mac.7374.

Lehmann, K., and M. Förtsch. 2023. KI-Studie. Chancen, Risiken und Perspektiven für Medien. [AI-study: Chances, Risks, and Perspectives for Media.] XPLR: MEDIA in Bavaria.

Lindén, C.-G., and H. Tuulonen. 2019. News Automation: The Rewards, Risks and Realities of Machine Journalism, WAN-IFRA Report. Frankfurt: WAN-INFRA.

Loosen, W., and P. Solbach. 2020. "Künstliche Intelligenz im Journalismus? Was bedeutet Automatisierung für journalistisches Arbeiten? [Artificial Intelligence in Journalism? What Does Automation Mean for Journalistic Work?]." In *Nachrichten im digitalen Zeitalter: Ein Handbuch. [Fake News, Framing, Fact-Checking: News in the Digital Age: A Handbook]*, edited by T. Köhler, 177–204. Bielefeld: transcript Verlag.

Newman, N., R. Fletcher, A. Schulz, S. Andı, and R. K. Nielsen. 2020. "Digital News Report." *Reuters Institute for the Study of Journalism*. Oxford, UK: University of Oxford.

Nishal, S., and N. Diakopoulos. 2023. *Envisioning the Applications and Implications of Generative AI for News Media*. Hamburg, Germany: CHI'23 Generative AI and HCI Workshop April 23–28,.

Olsen, R. K. 2021. "The Value of Local News in the Digital Realm—Introducing the Integrated Value Creation Model." *Digital Journalism* 9(6): 810–34.

_____, and _____. 2018a. "Bouncing off the Paywall—Understanding Misalignments between Local Newspaper Value Propositions and Audience Responses." *International Journal on Media Management* 20(3): 174–92.

2018b. "Reinventing the Business Model for Local Newspapers by Building Walls." *Journal of Media Business Studies* 15(1): 24–41.

Olsen, R. K., A. Kammer, and M. K. Solvoll. 2020. "Paywalls' Impact on Local News Websites Traffic and their Civic and Business Implications." *Journalism Studies* 21(2): 197–216.

Olsen, R. K., and B. R. Mathisen. 2023. "Deserted Local News: Exploring News Deserts from a Journalistic Recruitment Perspective." *Media and Communication* 11(3): 390–400.

Piechota, G. 2022. *News Biz Models: What Happens When You Hit a Wall*. Dallas, TX: International News Media Association.

Picard, R. G. 2006. *Journalism, Value Creation and the Future of News Organizations. Shorenstein Center Research Paper Series*. Cambridge, MA: Harvard University.

2010. *Value Creation and the Future of News Organizations: Why and How Journalism Must Change to Remain Relevant in the Twenty-First Century*. Lisbon: Media XXI.

Porlezza, C. 2023. "Promoting Responsible AI: A European Perspective on the Governance of Artificial Intelligence in Media and Journalism." *Communications* 48(3): 370–94.

Porter, M. E. 1985a. "Technology and Competitive Advantage." *The Journal of Business Strategy* 5(3): 60–78.

1985b. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Simon and Schuster.

Portugal, R., B. Wilczek, M. Eder, N. Thurman, and M. Haim. 2023. "Design Thinking for Journalism in the AI Age: Towards an Innovation Process for Responsible AI Applications." Paper presented at the Joint Computation + Journalism European Data & Computational Journalism Conference 2023, Zurich, Switzerland, June 22-24, 2023. https://openaccess.city.ac.uk/id/eprint/30698/.

Posetti, J. 2018. *Time to Step Away from the 'Bright, Shiny Things'? Towards a Sustainable Model of Journalism Innovation in an Era of Perpetual Change*. Oxford, UK: Reuters Institute for the Study of Journalism, University of Oxford.

Pourashraf, P., and B. Mobasher 2022. "Using Recommender Systems to Help Revitalize Local News." In Adjunct Proceedings of the 30th ACM Conference on User Modeling, Adaptation and Personalization (UMAP '22 Adjunct), Barcelona, Spain, July 04–07, 2022. New York, NY: ACM.

Reporters Without Borders. 2023. Paris Charter on AI and Journalism. November 10, 2023. https://rsf.org/sites/default/files/medias/file/2023/11/Paris%20charter%20on%20AI%20in%20Journalism.pdf.

Rinehart, A., and E. Kung. 2022. *Artificial Intelligence in Local News. A Survey of US Newsrooms' AI Readiness*. New York: Associated Press Report.

Saltz, H. 2020. "Removing Paywalls on Coronavirus Coverage is Noble. It Also Makes No Sense." *Poynter*, April 6, 2020. https://www.poynter.org/business-work/2020/removing-paywalls-on-coronavirus-coverage-is-noble-it-also-makes-no-sense/.

Simon, F. M. 2023. "Escape Me If You Can: How AI Reshapes News Organizations' Dependency on Platform Companies." *Digital Journalism* 12(2): 149–70. https://doi.org/10.1080/21670811.2023.2287464.

Sirén-Heikel, S., M. Kjellman, and C.-G. Lindén. 2023. "At the Crossroads of Logics: Automating Newswork with Artificial Intelligence—(Re)defining Journalistic Logics from Technologists." *Journal of the Association of Information Science and Technology* 74(3): 354–66.

Sjøvaag, H., and T. Owren. 2021. "The Non-substitutability of Local News. Advertising and the Decline of Journalism's Umbrella Market Model." *Nordicom Review* 42(1): 1–14.

Skog, K., and Withrow E. 2022. "Introducing the Experiments and Personalization Team." *The New York Times Company*, March 30, 2022. https://www.nytco.com/press/introducing-the-experiments-and-personalization-team/.

Steering Committee on Media and Information Society of the Council of Europe. 2023. "Guidelines on the Responsible Implementation of Artificial Intelligence Systems in Journalism." Council of Europe, December 12, 2023. https://www.coe.int/en/web/freedom-expression/-/guidelines-on-the-responsible-implementation-of-artificial-intelligence-ai-systems-in-journalism.

Stray, J. 2019. "Making Artificial Intelligence Work for Investigative Journalism." *Digital Journalism* 7(8): 1076–1097.

Tang, H., L. Qi, and X. Zhang. 2020. "The Impact of Algorithm on Local Journalism: A Comparative Study on Report of Wuxi's Bridge Collapse in 2019." *Advances in Journalism and Communication* 8(3): 69–79.

Thäsler-Kordonouri, S., and K. Barling. 2023. "Automated Journalism in UK Local Newsrooms: Attitudes, Integration, Impact." *Journalism Practice*: in press. https://www.tandfonline.com/doi/full/10.1080/17512786.2023.2184413.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Thurman, N. 2018. "Social Media, Surveillance, and News Work. On the Apps Promising Journalists a "Crystal Ball."" *Digital Journalism* 1(6): 76–97.

Thurman, N., K. Dörr, and J. Kunert. 2017. "When Reporters Get Hands-on with Robo-writing: Professionals Consider Automated Journalism's Capabilities and Consequences." *Digital Journalism* 5(10): 1240–59.

Thurman, N., S. C. Lewis, and J. Kunert, eds. 2021. *Algorithms, Automation, and News: New Directions in the Study of Computation and Journalism*. London: Routledge.

Thurman, N., S. Stares, and M. Koliska. 2024. "Audience Evaluations of News Videos Made with Various Levels of Automation: A Population-Based Survey Experiment." *Journalism: Theory, Practice & Criticism*: 1–21 https://doi.org/10.1177/14648849241243189.

University of Waterloo. 2019. New Tool Uses AI to Flag Fake News for Media Fact-Checkers. https://www.sciencedaily.com/releases/2019/12/191216122422.html.

UnternehmerTUM. 2020. *Applying AI: How to Find and Prioritize AI Use Cases*. AAI: Initiative for Applied Artificial Intelligence. https://aai.frb.io/assets/files/AppliedAI_Whitepaper_UseCase_Webansicht.pdf.

Van der Haar, J. W., R. G. Kemp, and O. Omta. 2001. "Creating Value That Cannot Be Copied." *Industrial Marketing Management* 30(8): 627–36.

Veglis, A., and T. A. Maniou. 2019. "Chatbots on the Rise: A New Narrative in Journalism." *Studies in Media and Communication* 7(1): 1–6.

Vogler, D., M. Eisenegger, S. Fürst, L. Udris, Q. Ryffel, M. Riviere, and M. S. Schäfer. 2023. "Künstliche Intelligenz in der journalistischen Nachrichtenproduktion: Wahrnehmung und Akzeptanz in der Schweizer Bevölkerung." *[Artificial Intelligence in the Journalistic News Production: Perceptions and Acceptance among Swiss Citizens] fög—Forschungszentrum Öffentlichkeit und Gesellschaft /Universität Zürich*. Jahrbuch Qualität der Medien 2023 [Yearbook Quality of the Media]. Basel: Schwabe Verlag, 33–45.

Von Rimscha, B., and G. Siegert. 2015. *Medienökonomie. Eine problemorientierte Einführung [Media Economics. A Problem-Oriented Introduction]*. Wiesbaden: Springer VS.

Wahl-Jorgensen, K. 2019. "The Challenge of Local News Provision." *Journalism* 20(1): 163–66.

Wang, S. 2018. "After Years of Testing, The Wall Street Journal Has Build A Paywall that Bends to the Individual Reader." Nieman Lab, February 22, 2018. https://www.niemanlab.org/2018/02/after-years-of-testing-the-wall-street-journal-has-built-a-paywall-that-bends-to-the-individual-reader/.

Wilczek, B., K. Stanoevska-Slabeva, K. Kernbach, and M. Meckel. 2021. "Un-locking Strategic Lock-ins of Local Media: An Investigation of Local Media's Preferences towards Public Support for Strategic Innovation." *Digital Journalism* 9(3): 276–99.

Wilczek, B., N. Thurman, M. Haim, N. Helberger, A. Fokkens, W. van Atteveldt, and H. Sjøvaag. 2022. AI Adoption Patterns in Local Journalism: Current Use and Future Potential in the German Media Market. Presentation at the 72nd Annual Conference of the ICA, Paris, France.

Zilic Fiser, S., and P. Caks. 2023. "Strategies for the Minimisation of Misinformation Spread Through the Local Media Environment." *Journalism Practice* 17(10): 2241–62.

How to cite this article: Wilczek, B., M. Haim, and N. Thurman. 2024. "Transforming the Value Chain of Local Journalism with Artificial Intelligence." *AI Magazine* :1–12. https://doi.org/10.1002/aaai.12174

AUTHOR BIOGRAPHIES

Bartosz Wilczek is a PostDoc in the Department of Media and Communication at LMU Munich, Germany. His research and teaching interests focus on AI in journalism, digital journalism, and media management.

Mario Haim is a professor of Communication Science and particularly Computational Communication Research in the Department of Media and Communication at LMU Munich, Germany. His research and teaching interests circle around algorithmic influences on society, such as in political communication, journalism, health communication, or news use.

Neil Thurman is a professor of Communication in the Department of Media and Communication at LMU Munich, Germany. He is also an honorary senior research fellow in the Department of Journalism at City, University of London.

23719621, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/aaai.12174, Wiley Online Library on [24/05/2024]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License