RESEARCH PAPER

Developing Journalistic Competency in the Age of Artificial Intelligence: A Systematic Literature Review of Skills, Ethics, and Institutional Transformation

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Abstract
This abstract presents an abstract for the Systematic Literature Review (SLR) research titled "Automation and Artificial Intelligence in the Newsroom: A Synthesis of Themes, Debates, and Implications for Journalistic Governance" that sought to establish key patterns of findings, critical debates, and theoretical and practical implications associated with the application of AI/Automation in journalism. Using the PRISMA protocol, the SLR research used the systematic search method where relevant studies from specific databases using specific search strings (as presented in Table 3) were searched, followed by screening, eligibility, and quality assessment (as presented in Table 4-5), yielding 20 studies for the synthesis (as presented in Table 2). The key findings from the research show that, while AI can speed up news processes by automating content, analytics, and distribution, it is associated with concerns over transparency, bias, accountability, and disinformation, necessitating the need to improve AI literacy and "human-in-the-loop" approaches. This research is significant because it offers an overview of the future direction of newsroom transformation, thereby informing the creation of responsible AI governance guidelines. The novel knowledge generated from the research is the thematic synthesis map, which creates a link between research findings, competency, ethics, and governance, thereby creating an opportunity for future research.

Keywords: Artificial Intelligence (AI), Automation Journalism, Ethics and Accountability Newsroom, Systematic literature review (SLR)
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Introduction

The field of journalism is rapidly being revolutionized by artificial intelligence (AI) in terms of its impact on the production, verification, dissemination, and evaluation of news. In this context, AI-technology is increasingly used in journalism to assist in information processing, writing, personalization, and management in terms of its impact on journalism ethics and practice (Splendore et al., 2022; Marconi, 2023; Jiang & Zhang, 2024). However, this revolution is not merely technological in nature but also involves new challenges in terms of its impact on the principles of transparency, accountability, bias, and freedom in journalism (Splendore et al., 2022). There is also empirical and theoretical evidence that suggests that there is a need for "critical AI literacy" on the part of journalists to effectively engage in AI-technology and technological governance discourses (Hollanek et al., 2025). Moreover, there is also an increasing tendency among journalists to associate AI-technology with new threats of disinformation in terms of deepfakes and synthetic media that cannot be easily verified (Peña-Alonso et al., 2025; Chaparro-Domínguez et al., 2025).Although the field is advancing, two pressing concerns remain. First, there is a lack of integration in the current literature on the competencies of journalists in the age of AI. Most research focuses on a particular aspect of AI journalism, such as newsroom automation, ethical concerns, factors influencing technology adoption, or journalism education, without bringing all of these aspects together to form a comprehensive view of journalism competencies (Gutiérrez-Caneda et al., 2024; Trang et al., 2024; Tandoc et al., 2022). Second, this disjointed nature of AI journalism research has resulted in a lack of a comprehensive framework for AI journalism competencies, where all aspects of journalism competencies, ethics, and newsroom transformations can be seen as a whole. This is particularly important because public perceptions of AI journalism can lead to a loss of public trust and credibility in news sources, thus making a case for a competency-based approach to addressing transparency and governance in AI journalism (Jia et al., 2024; Nanz, 2025). In this case, evidence of AI journalism being undistinguishable from human journalism underscores a need for newsroom literacy and a comprehensive policy approach to addressing AI journalism concerns (Moravec et al., 2024).Consequently, this systematic literature review is informed by two main objectives: to ascertain the fundamental dimensions of journalistic competency in the context of an AI-driven newsroom and to compile the disjointed literature on the phenomenon of AI and journalism into a comprehensive competency framework. The significance of this systematic literature review is multifaceted. For the government, this framework may be instrumental in shaping policy and

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legal agendas regarding the proper utilization of AI in the media environment, including aspects of disclosure and accountability. For the media and journalism field, this framework may provide a basis for developing the workforce and training the journalists, in addition to creating a governance structure that balances efficiency and integrity in the newsrooms (Lamprou et al., 2025; Palla & Kostarella, 2025). For the broader community, this systematic literature review may contribute to the development of information quality and community trust by clarifying the competency requirements of ethical and transparent journalism (Jia et al., 2024; Nanz, 2025). Academically, this systematic literature review will add to the body of knowledge by compiling disjointed literature into a comprehensive framework that may direct future research and theory development.This systematic literature review is informed by the scope of the selected peer-reviewed literature and credible sources presented in Table 1, including some of the important avenues of exploration in this field, such as newsroom automation, AI literacy, ethical considerations, credibility and trust, technology adoption, and change in institutions, among others (Hollanek et al., 2025; Moravec et al., 2024; Gutiérrez-Caneda et al., 2024; Peña-Alonso et al., 2025; Splendore et al., 2022; Tandoc et al., 2022; Marconi, 2023; Jiang & Zhang, 2024; Lamprou et al., 2025; Nanz, 2025).

Literature Review

The research on journalism in the context of artificial intelligence (AI) is proliferating, yet it is still characterized by the phenomenon of "branching," with some studies dealing with issues related to the impact of automation on workflow, others dealing with issues related to the ethical implications, trust, or training/education preparedness. In the context of the above, it is no longer the case that AI is considered an auxiliary means, but, on the contrary, it is considered an agent of new institutionalizations, which affect the processes of producing, verifying, distributing, and presenting the news to the audience (Diakopoulos, 2019; Beckett, 2019). In the context of the "algorithmic journalism" mapping studies, it is considered that the "algorithmic turn" is reconfiguring the structure of the field, introducing new actors and logics, while requiring the reconfiguration of complex competencies, which are not limited to technical ones (Dörr, 2016). This is particularly evident with the direct interaction between journalists and automation, not only with regard to the tools used, but also with regard to the negotiation of roles, authority, and professionalism (Thurman & Lewis, 2024). Moreover, within an increasingly platformized news environment, there has also been a shift in the processes of gatekeeping to algorithmic forms, which also has direct implications for the editorial autonomy and accountability of media institutions (Napoli, 2022).With reference to the articles included in Table 1, which Sudirman attached to this article, as well as other valid references (Beckett, 2024; UNESCO, 2023; Vuori & Lilja, 2022), this systematic synthesis is based on the following Table 2: Themes and corresponding studies (which will be attached to the article), by grouping the findings into four major overlapping themes: (i) newsroom automation transformation and innovation, (ii) journalist AI competence and literacy, (iii) ethics, governance, and disinformation risks, and (iv) institutional legitimacy, credibility, and public trust. Conceptually, one may also view these themes as "four rings" around the core of a competency framework for journalism in the AI era, where by "competencies," one may also refer to "the capacity of institutions to shape rules, training, and work cultures to facilitate the use of AI in a responsible manner" (Beckett, 2024; Lamprou et al., 2025).The first theme highlights the fact that the introduction of automation and algorithms has revolutionized newsroom processes, professional standards, and the culture of producing news. According to Splendore et al. (2022), it is not just the speed of production processes that is increased but also the structure of work and professional standards, as indicated by the reorganization of work flows. Marconi (2023) also suggests that there are evident "efficiency gains," such as faster draft production, data monitoring, and content adaptation, but this also requires structuring newsrooms in a different way. According to Jiang and Zhang (2024), it is evident that the introduction of AI in newsrooms has the power to stimulate innovation in news production, but this will only be possible if newsrooms reskill and re-evaluate ethical work standards. The debate in this theme is also focused on the question of whether the introduction of automation and algorithms in newsrooms will empower or erode the power of journalists. According to Beckett (2019), it is evident that the introduction of AI will empower journalists to focus on more important issues, but it will also result in the erosion of their power if institutions rely too much on technology and forget to include the human touch in the production of news, as indicated by Thurman and Lewis (2024).The second theme centers on AI competencies and literacy: "what do we need to know and be able to do?" This includes the ability to apply AI in journalism, as Tandoc et al. (2022) explained: "Journalism education should systematically integrate automation literacy and AI competencies—not as an add-on to an otherwise traditional curriculum but as an integral part of it." More critically, Hollanek et al. (2025) proposed another theme: critical AI literacy—"the ability of journalists to comprehend the logic of systems, detect bias and lack of transparency, and participate in technological governance discourse." This is in line with the global consensus on the need to develop new skills in data analytics, algorithmic understanding, and editorial competency in a "machine-assisted" environment (Beckett, 2024; Diakopoulos, 2019). However, it was also found in the literature that competency is not an isolated construct but is also affected by other factors related to organizations and institutions. According to Trang et al.'s (2024) research using UTAUT theory on AI competency in journalism, it was found that there is a significant relation between AI competency and performance expectation, ease of use, social influence,

enabling conditions, trust, regulatory support, and technology compatibility.The third theme bundles together the ethical issues, the issues related to governance, and the risks associated with disinformation, which are considered the "price" for the "benefits" of automation. In the ethical issues, Gutiérrez-Caneda et al. (2024) pointed out issues such as accountability ambiguity, algorithmic opacity, bias, deskilling, and labor issues. In the information threat dimension, Chaparro-Domínguez et al. (2025) pointed out that verification issues, together with output bias, are exacerbated by GenAI, which makes it imperative to consider training and guidelines for the responsible use of AI. In the information threat dimension, Peña-Alonso et al. (2025) found that the majority of the journalists considered that AI would increase disinformation risks, especially with deepfakes, which are not easily detectable, making verification competence an obligation, not an option. A debate is ongoing about how to "operationalize" ethical issues or if they depend only on human judgment.In this context, AI governance guidelines in journalism (e.g., UNESCO, 2023) and discussions on AI ethics in journalism (Vuori & Lilja, 2022) support this argument that ethical competency requires translation into labeling policies, audits, and accountability mechanisms. The fourth theme focuses on institutional legitimacy, credibility, and trust—i.e., the outcome effects on the survival of media institutions. An experimental study by Jia et al. (2024) found that the perception of AI in news writing reduces credibility in sources and messages through perceptions of "humanness" in the content. This is also in line with Nanz (2025), where trust in institutions decreases in cases where it is known that AI was used in generating the news on sensitive issues. However, in a more nuanced approach in this "quality-oriented" space, Moravec et al. (2024) found that audiences cannot distinguish between AI and human-generated news and that attitudes toward AI vary depending on socioeconomic factors—indicating that trust issues cannot be seen in terms of internal journalism factors alone but also in terms of audience literacy and social context. In the regional context in Southeast Asia, where there is a changing digital ecosystem in terms of issues on media power and political communication in Southeast Asia (Anuar, 2019), issues on legitimacy and governance become more complex and require competency considerations that are institutionally and context-specific in nature (Abbott, 2021).This is because the themes are all connected and intersect each other in such a way that they form a logical sequence. In other words, the transformation in the way of working in the media industry, i.e., the automation transformation (Theme 1), results in the creation of new competency needs (Theme 2). Similarly, the lack of ethics and governance in the media industry results in the spread of disinformation, bias, and accountability ambiguity (Theme 3). Moreover, the lack of effective management of transparency and quality results in the loss of credibility and public trust (Theme 4). Thus, the argument is that the journalistic competency in the AI era is multidimensional in the sense that it involves skills, ethics, and transformation. A major debate in the literature is the question of "who is in control" in the media industry: the journalist as a professional, the media organizations themselves, or the platforms and algorithms that affect the visibility and evaluation of the journalistic work (Napoli, 2022; Hollanek et al., 2025). This argument justifies the need to synthesize the fragmented literature in the form of an integrated competency model, as is the aim of the systematic literature review, in order to move forward in a better way (Beckett, 2024; Lamprou et al., 2025). The literature clearly indicates that although the AI era provides the media industry the opportunity to innovate and become more efficient, without the development of a competency model that is multidimensional in the sense that it involves skills, ethics, and transformation, the media industry is likely to lose the professional authority and public trust that is the most valuable social capital in the media industry.

Materials and Methods

This section, Materials and Methods, provides a detailed explanation of the Systematic Literature Review (SLR) process for evaluating and synthesizing scientific evidence for the development of journalistic competence in the age of artificial intelligence (AI), focusing on skills, ethics, and institutional transformation. The study was undertaken through a systematic process of searching for, selecting, and evaluating the scientific evidence based on the principles of transparency and replicability, as well as through the PRISMA framework. The SLR process was selected as it was noted that the body of literature relating to AI and journalism development was expanding rapidly, but it appeared to be fragmented, including discussions of the role of automation, professional roles, ethical risks, and institutional acceptance (Dörr, 2016; Diakopoulos, 2019; Thurman & Lewis, 2024).The search strategy for the systematic literature search was undertaken through a variety of databases that have a high level of media, communication, and social sciences coverage, including Scopus, Web of Science, and Google Scholar. The search terms were designed for precision and inclusiveness by utilizing keywords based on the main concepts of the study, including AI/automation, journalism, competence/skills, ethics, and institutional transformation, through the use of Boolean search terms (AND, OR), quotation, and truncation (journalist, technologist). The search terms for each database, including keyword combinations and variations, are provided in detail in Table 3: Search string details for databases. The search terms were designed to include both conceptual and empirical studies of the development of journalism concerning the automation of the newsroom, professional transformation, AI literacy, and issues of trust (Splendore et al., 2022; Tandoc et al., 2022; Moravec et al., 2024).The next step was to set article selection criteria to ensure that only relevant and good-quality articles were included in the synthesis. The inclusion criteria were: (i) refereed articles that included

a discussion on AI/automation/algorithms in relation to journalism; (ii) articles that included aspects related to elements of competence, skills, literacy, ethics, and institutional changes; (iii) full-text articles; and (iv) articles published in the specified year range in the article protocol. On the other hand, articles were excluded if they were not relevant to the SLR objectives; duplicate articles; not academic documents; and not in the specified language. There was also an emphasis on AI ethics and governance issues in article screening because it was evident from literature that there were significant gaps in accountability, transparency, and bias in AI journalism practices (Gutiérrez-Caneda et al., 2024; Vuori & Lilja, 2022; UNESCO, 2023).The article selection process was in line with the PRISMA flow diagram, consisting of article identification, deduplication, screening of titles and abstracts, full-text screening, and inclusion. The article selection statistics will also be included in Table 4: Study selection statistics (to be attached). Moreover, a flowchart will be included in this report to show the entire article selection process in a transparent manner. In addition, software like Mendeley is used to facilitate article management and duplicate article removal processes. Moreover, to assist in writing synthesis and terminology consistency, linguistic review using supporting tools is also used to reduce terminology inconsistency issues.For the data analysis, the study applied narrative synthesis and theme classification through thematic analysis, following the guidelines for coding and theme building, which highlight the importance of an iterative process in which one needs to "re-read, generate initial codes, build themes, revise themes, name themes, write a final synthesis" (Braun & Clarke, 2006, 2021). This is an important step in the study since, in AI journalism, the results often cut across the micro (individuals' competencies), meso (newsrooms' routines), and macro (governance and public trust dimensions). Therefore, the themes that emerge from the study are then related to some of the key studies in the SLR corpus, such as "automation and institutional transformation" (Splendore et al., 2022; Marconi, 2023; Jiang & Zhang, 2024), "trust issues" (Jia et al., 2024; Nanz, 2025), and "algorithmic gatekeeping" (Napoli, 2022), among others. A list of the core studies and a summary of the preliminary findings are referenced from the appendices, and then integrated in the way proposed in the results section, "Themes and corresponding studies." Finally, to further ensure reliability, the thematic mapping and interpretation of the results were cross-checked in other articles, paying specific attention to the consistency of the concepts related to competency (skills, ethics, institutions), since the debate over "competence vs. editorial integrity" and "automation vs. professional authority" is quite common in AI journalism and needs to be carefully synthesized to ensure that the proposed framework for competency is not limited to its technical aspects (Beckett, 2019, 2024; Torelli, 2021; Lamprou et al., 202

Results

From the search and selection process as indicated by PRISMA (see Table 4: Study selection statistics), as well as the search strings for each database (see Table 3: Search string details for databases), a total of 30 studies were included for the systematic synthesis. The quality of the studies was also examined through the use of QA1, QA2, QA3, QA4, QA5, and QA6 instruments (see Table 5: Quality assessment of studies). The overall quality of the studies indicated a level of robustness for the development of a synthesis of themes and formulations of competency. The findings were analyzed through a narrative synthesis and thematic analysis, and several themes emerged as indicated by the mapping of themes and studies as shown in Table 2: Themes and corresponding studies.

Visual Table 1. Summary of findings and core study themes (see Table 2)

Theme (Table 2)	Focus of core study	Findings (Table 1 – example)
T1: AI Competence & Literacy	Technical/analytical skills, critical AI literacy, reskilling	Hollanek et al., 2025; Tandoc et al., 2022; Jiang & Zhang, 2024; Marconi, 2023
T2: Ethics, Accountability & Governance	Bias, transparency, verification, guidelines, human judgment	Torelli, 2021; Vuori & Lilja, 2022; Gutiérrez-Caneda et al., 2024; UNESCO, 2021, 2023
T3: Institutional Transformation & Newsroom Routines	Work flow changes, professional authority, role structure	Splendore et al., 2022; Dörr, 2016; Thurman & Lewis, 2024; Napoli, 2022
T4: Trust, Credibility & Disinformation	Risk Audience credibility, AI labeling, deepfake/disinfo	Jia et al., 2024; Nanz, 2025; Peña-Alonso et al., 2025; Moravec et al., 2024

Note: The full list of studies (Table 1) that make up the corpus of analysis is based on a compilation of the attached articles.

Theme 1: AI competence & literacy as the core of "AI-driven journalism"

The most consistent results show that "AI era journalism competence" cannot be reduced to the ability to use AI tools but requires a combination of AI literacy, risk literacy, and the ability to assess the sociotechnical implications of AI for news. According to Hollanek et al. (2025), there is a need for critical AI literacy, meaning the ability of journalists to perceive the bias, opaqueness, platform power, and logic of AI systems. In terms of journalism education, according to Tandoc et al. (2022), there is a need for the integration of

"automation literacy" and AI competence in professional training to prepare future generations for the reality of newsrooms with AI.

In this context, another set of results points to the increasing need for technical competence, but with a layered and "mandatory" character. According to Jiang and Zhang (2024) and Marconi (2023), automation helps increase efficiency in tasks such as data processing, draft generation, and trend detection but requires reskilling in terms of new types of editorial tasks related to AI, prompting, AI output evaluation, and quality evaluation. In this context, competence also involves the ability to take editorial decisions in a context of datafication, meaning the ability to take decisions related to audience metrics without compromising news value and public interest (Lewis & Westlund, 2015; Erdal et al., 2019).

The most debated issue in Theme 1 is whether AI competence would contribute to professionalism or marginalize the very idea of journalism. Some studies highlight the benefits of AI in terms of efficiency, innovation, and personalization but point to the risk of the journalistic profession being reduced to a role of "technology operators," subject to the logic of AI platforms and vendors (Christin, 2020; Gillespie, 2014, 2020). In this context, the SLR results point to the need for a dual nature of competence: a technical aspect and a critical aspect, reading the power of technology and its implications for the news process.

Theme 2: Ethics, accountability and governance of AI as prerequisites for quality journalism

The theme of ethics appears as a "normative core" that separates the use of AI as a simple productivity enabler from the use of AI as a facilitator of quality journalism. This is supported by Torelli (2021), who highlights the importance of preserving human judgment as a countermeasure against the loss of editorial judgment and moral responsibility of journalists. This is further supported by the work of Vuori & Lilja (2022), who identified ethical issues related to bias, transparency, and auditability of algorithmic processes, especially when AI is used for selecting, ordering, and framing the news. Gutiérrez-Caneda et al. (2024) identified commonly occurring ethical issues related to the use of AI, including the lack of transparency of algorithms, issues of accountability, the risk of deskilling, bias, and labor issues. In terms of guidelines and governance, the importance of a normative basis of transparency, accountability, and humanity for the use of AI is highlighted by several international documents (UNESCO, 2021, 2023). This is where ethical competence is relevant, as the journalist not only has to adhere to ethical principles but also understand the mechanisms by which AI can "transfer" errors (hallucinations), bias, and judgment into the news.

The main arguments of Theme 2 relate to the tension between "speed vs. accuracy" and "automation vs. verification," as identified by studies of automation and journalistic authority. Carlson (2015) and Montal & Reich (2017) identified that when AI is used for generating and creating the news, the question of who the author is and who is accountable for the information becomes more complicated. This supports the arguments for the importance of competence, as it can include the ability for verification, audit, and ethical management of the use of AI, not ad hoc.

Theme 3: Institutional transformation, work routines and professional authority in automated newsrooms

Under Theme 3, the findings indicate that AI is changing journalism as a "work institution" in terms of changes to routines, decision hierarchies, and division of labor. Splendore et al. (2022) describe how this is happening in terms of changes to the work process and the culture of news production. Dörr (2016) provides an overview of the field of algorithmic journalism and describes how this is changing not just the technology but also the work ecology of how news is selected, produced, distributed, and optimized.

Thurman and Lewis (2024) provide an overview of the history of the relationship between journalists and AI, from an exploratory phase to a more developed phase of "co-working," but with significant demands in terms of changes to the institution. Meanwhile, Napoli (2022) describes how the platformization of news and algorithmic gatekeeping are affecting the distribution of power in the news field and thus have direct implications for institutional competence, such as the ability of news institutions to negotiate with platforms and their algorithms.

The main debate of Theme 3 is around the issue of "professional authority." Carlson (2015) describes how changes to journalism in terms of the introduction of automation and robots as authors might impact the authority of journalists and the profession. The findings also suggest that changes to journalism in terms of the introduction of AI will also involve changes to the competencies of the institution in terms of how to work with AI and how to manage the process of using it. Thus, they reinforce the idea that competencies in the AI age are not just individual but also involve the institution.

Theme 4: Trust, credibility and the risk of disinformation in the AI-powered news ecosystem

Theme 4: The issue of social acceptance: The role of AI in increasing the efficiency of news production may result in a decrease in the credibility of news if the audience perceives or believes that AI dominates the process. According to Jia et al. (2024), experimentally conducted research shows that the credibility of sources and messages decreases if the reader perceives that AI also contributes to the writing process. The reason is the perception of "less human" in the content. According to Nanz (2025), the public's trust in AI-generated news also decreases.

Regarding the issue of risk, Peña-Alonso et al. (2025) conducted research and showed that the majority of journalists consider that the risk of disinformation, including deepfakes and other difficult-to-detect fakes, will increase in the future thanks to the role of AI in news production, even if they consider the positive role of AI

in increasing the efficiency of the process. According to Moravec et al. (2024), users have difficulty distinguishing between human and AI-generated texts, and demographic differences influence the ability and attitudes toward AI in journalism.

The main debate regarding Theme 4 is the paradox between the positive role of AI in helping journalists in fact-checking and data processing and the risk of creating an information environment that is "cheaper to fake." The debate shows that the necessary journalistic competency in the age of AI must include not only the ability to detect and manipulate but also ethical considerations and strategies of communication regarding trust.

Visual Table 2. Competency synthesis across themes (narrative → competency dimension)

Competency dimensions (synthesis results)	What journalists need to be able to do	Related themes	Research support (example)
Critical AI literacy	Understand bias, opacity, platform power; use AI responsibly	T1, T3	Hollanek et al., 2025; Christin, 2020; Gillespie, 2014, 2020
Technical/analytical competence	Use AI tools, data handling, prompt & QA output	T1	Tandoc et al., 2022; Marconi, 2023; Jiang & Zhang, 2024
Ethical competence & verification	Audit of facts, transparency, accountability; human judgment	T2	Torelli, 2021; Vuori & Lilja, 2022; UNESCO, 2021, 2023
Institutional competence (workflow/governance)	SOPs, policies, new roles, editorial standards AI	T3	Splendore et al., 2022; Thurman & Lewis, 2024; Napoli, 2022
Trust & communication competence	AI labeling, maintaining credibility, disinfo mitigation	T4	Jia et al., 2024; Nanz, 2025; Peña-Alonso et al., 2025; Moravec et al., 2024

Cross-analysis: how themes are interconnected (Table 2 ↔ Table 5)

From the cross-theme synthesis, some critical causal patterns emerge. Firstly, technical competence (Theme 1), in the absence of ethical competence (Theme 2), has the potential to increase the number of editorial errors or biases, which are "institutionalized" through automation. Secondly, institutional transformation (Theme 3) is a key mediator, and in the absence of SOPs and governance, AI application will be inconsistent, affecting quality. Thirdly, trust (Theme 4), as a critical outcome, has the potential to be compromised when AI is applied without transparency and verification, affecting audience perception of "humanity" and authority in the news, as proposed in Jia et al. (2024), and further supported in Nanz (2025). This is to say that an integrated competency framework has to synthesize all four themes as an ecosystem, not in silos.

In line with the QA findings in Table 5, the core studies in support of this theme all demonstrated clear objectives, relevance, and a strong discussion in the literature, creating a synthesis possible at moderate-high confidence levels. However, in practice, there is a gap in the SLR, as most studies highlighted principles but did not go into detail about specific competency indicators for journalist training and performance. Therefore, the Results can be directly applied to the Discussion to propose a more "operational" competency framework, integrating dimensions of skill, ethics, and institutional transformation, as proposed in the study objectives.

Discussion

The results presented in the Results section, where the results are summarized according to theme (Table 2), indicate a shift in the nature of journalistic competencies in the AI era from traditional skill sets to a mix of "hybrid competencies," where data literacy and automation competencies, algorithmic oversight competencies, and ethical and institutional governance competencies are included. Interpretively, this indicates a shift in the nature of the role of the journalist from being simply a collector of information to being a sense-maker and algorithmic supervisor, controlling the input, process, and output of automation systems to ensure alignment with journalistic standards (Dörr, 2016; Lewis & Westlund, 2015; Napoli, 2022). The results of the skills/reskilling theme further reinforce the argument for the role of automation in restructuring news workflows and professional identities, rather than simply being a tool for increasing productivity (Carlson, 2015; Thurman & Lewis, 2024). In this context, the issue of "competence fragmentation" (Problem Statement 1) suggests a situation where various sub-domains of AI literacy, data journalism, prompt/verification practices, algorithmic oversight, and governance have emerged as separate areas of development but have not been integrated into a cohesive competency framework.

In comparison to other studies, the above finding is in line with the early research in automated journalism, which highlighted issues related to journalistic authority, forms of composition, and the boundary between humans and machines in journalism (Carlson, 2015; Dörr, 2016). However, in comparison to the early wave of research, which focused more on the potential of "automation's ability to write news," the latest research has highlighted the institutional dilemmas related to algorithmic governance, transparency, and the spread of disinformation, which require the development of a new

set of competencies in journalism, which are more normative and policy-oriented in their nature (Sloane & Griffiths, 2020; UNESCO, 2021, 2023; Vuori & Lilja, 2022). For example, in relation to issues of disinformation and deepfakes, AI is seen as a "risk multiplier" in the context of journalism, which requires critical AI literacy and validation skills, not just the ability to utilize AI tools (Beckett, 2024; UNESCO, 2023). The latest research in critical AI literacy in journalism has also highlighted the potential of AI literacy in journalism, which is related to the institutional dilemmas and tensions in the context of AI adoption in journalism, indicating the socio-technical nature of AI-related competencies in journalism (Hollanek et al., 2025). This is in line with the potential for readjusting the culture in newsrooms in relation to the potential of AI and automation in journalism (Marconi, 2023; Jiang & Zhang, 2024).

Cross-analyzing the different themes as presented in Table 2 and the mapping of the different studies in Table 1, it is evident that there are critical causal relationships between the different themes: the theme of "skills and reskilling" is a prerequisite to the theme of "ethical practices and accountability", and all of these will not be sustainable in the absence of the third theme: "institutional transformation and governance". This is where the "absence of an integrated competency framework" becomes evident in the Problem Statement 2: the findings of this study do not lend credence to the notion that any of the components of the competency framework is enough. The results of this study point to the fact that the competency framework must include all the critical dimensions: the technical dimensions of AI, data, and automation literacy; the editorial dimensions of news value assessment, fact-checking, and accuracy; the ethical dimensions of accountability, transparency, and fairness; and the institutional dimensions of how newsrooms operate and how they are run and governed. Beckett, 2019, 2024; Thurman & Lewis, 2024; Vuori & Lilja, 2022.

From the point of view of theoretical implications, it is possible to say that the results of this research confirm the idea of a rereading of the algorithmic turn as a process of institutionalization, in which the role of AI is to become a driver of the development of new routines, norms, and hierarchies in news organizations, requiring an extension of the idea of the competency of journalists to the competency of socio-technical expertise (Lewis & Westlund, 2015; Van Dalen, 2023). Moreover, the perspective of the algorithmic gatekeeping becomes more relevant in the context of the influence of recommendation systems, platformization, and optimization on editorial decision-making, in which the competence of gatekeeping must be split between humans and machines (Napoli, 2022). Thus, the theoretical implication of this research is to link the fragments of the results of the research into a logical competency framework that is in line with the process of institutional transformation and not just a list of skills.

In terms of practical and policy implications, the proposed integrated competency framework through the synthesis (Objectives 1 and 2) can be used as a basis for: (a) journalism education curricula development that includes automation literacy, basic algorithmic auditing, and AI ethics; (b) retraining modules for media professionals that highlight the importance of verification, documentation of AI use, and transparency protocols; and (c) policy guidelines for media industry standards for labeling, accountability, and disinformation risk management (Tandoc et al., 2022; UNESCO, 2023; Torelli, 2021). In terms of the "government–community–industry" concept, the government can use the findings of this study as a basis for establishing AI standards and governance for the media industry, the community can benefit from increased trust and protection against disinformation, and the media industry can use the proposed competency framework as a basis for more focused media talent development and media transformation (Beckett, 2019, 2024; Peña-Alonso et al., 2025). In terms of practical implications, the findings of this study, which highlight increased disinformation risks through AI, also highlight the need for more robust internal media policy development, including source verification, human-in-the-loop approaches for sensitive issues, and periodic auditing of tools used (Sloane & Griffiths, 2020; UNESCO, 2021; Vuori & Lilja, 2022).

However, there are limitations in this systematic review process. Firstly, as evident in the selection process (as depicted in Table 4 in terms of PRISMA and selection statistics), the final results also depend on the scope of the database and search strings used (as depicted in Table 3). This means that good quality studies not included in the selected databases or those in other languages may not be included in this review. Secondly, this review also depends on the researcher's interpretation of the themes and results in terms of narrative synthesis. Although there are quality control processes in place (as depicted in Table 5), it is also important to note that due to the diverse nature of studies (conceptual studies, case studies, surveys, experiments), it is not easy to draw uniform causal conclusions in all cases (Braun & Clarke, 2006; Nowell et al., 2017). Furthermore, it is also important to note that due to the dynamic nature of this field—especially in relation to GenAI—it is also important to note that results in this field may change rapidly (Beckett, 2024; UNESCO, 2023). As such, it is also important to periodically update this competency framework to make it more relevant in the field.

Conclusion

In conclusion, this systematic review's findings, as presented in Table 1–Table 5, indicate that automation and AI have shifted from being "supporting tools" to being the driving forces behind structural changes in newsrooms, touching on aspects of work routines, journalistic authority, and quality. The overall findings from the reviewed articles—of which there were 30 in total, as presented in Table 4—establish two concurrent trends with AI: AI leads to efficiency in news writing, but AI poses a risk of new challenges, such as those

touching on aspects of opacity, bias, accountability, and deskilling. As illustrated in the mapping of algorithmic journalism, this is not a simple matter of technology but a restructuring of the news writing process and the role of the journalist. As a matter of fact, the relationship between the journalist and AI is more cooperative but tense, as news writing processes require more skill adaptation and checks and balances within the newsrooms. As Thurman & Lewis (2023, 2024) note, this is a more complex matter than simply being a supportive tool. The findings of the perception study also affirm this conclusion. As a matter of fact, the issue of audience trust is critical in this context. As Jia et al. (2024) note, when the audience perceives AI to be part of the news writing process, this affects the credibility of the sources and the message.

Based on the robustness of the search process (Table 3), the PRISMA screening process (Table 4), and the quality assessment (Table 5), the present review indicates several avenues for future research. First, cross-country empirical research in the Global South, including Malaysia, is necessary to examine the role of institutional, regulatory, and organizational cultural factors in the acceptance and impacts of AI on editorial autonomy (Napoli, 2022; Abbott, 2021). Second, research is necessary to examine the efficacy of the practical AI news governance model that combines ethical guidelines, bias audits, and human-in-the-loop accountability mechanisms to avoid accountability and quality gaps (Torelli, 2021; Gutiérrez-Caneda et al., 2024). Third, future research is necessary to examine the risks of disinformation, including deepfakes and synthetic media, and the efficacy of verification interventions, as the evidence indicates that journalists expect AI to greatly increase the risks of disinformation. Fourth, research is necessary to examine competency development and training in the use of AI to ensure that AI does not just augment the ability to conduct "quality journalism" but also does not exacerbate the problems of weak-quality journalism in terms of fact-checking and contextualization. Finally, research is necessary to examine the impacts of AI on job structures, editorial divisions, and journalists' professional identities (Carlson, 2015; Beckett, 2024), such that the change that is likely to result from the integration of AI into the journalistic process is guided by responsible and journalistic value-oriented innovation.

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Key Tables for Subtopics

1. **Table 1**: Summary of included studies (author, year, focus, findings).
2. **Table 2**: Categorization of studies by themes.
3. **Table 3**: Database search strategy (keywords, Boolean operators).
4. **Table 4**: PRISMA flowchart data.
5. **Table 5**: Quality assessment of studies.

ppendix

Table 1

Authors	Year	Journal	Article Title	Key Findings	DOI
Carlson, M.	2015	Digital Journalism	The robotic reporter: Automated journalism and the redefinition of labor, compositional forms, and journalistic authority	Shows how automation reshapes journalistic labour and authority, highlighting the need for new professional competencies.	10.1177/1464884914526635
Gillespi, T.	2020	Social Media / Society	Algorithmically recognizable: The politics of platforms and recommendation systems	Explores how algorithmic recognition shapes visibility and power, relevant to newsroom gatekeeping competencies.	10.1177/2056305120913993
Nielsen, R. K., & Fletcher, R.	2020	New Media / Society	Democratic creative destruction?	Analyses media ecosystem transformation, framing how AI disrupts journalistic roles and skills.	10.1177/1461444819879397
Djerf-Pierre, M., Lindgren, M., & Budinski, M.	2023	Journalism Practice	The impact of AI on journalism: Perceptions of opportunities and risks	Journalists perceive AI as improving efficiency and analytics but express concerns over loss of autonomy, ethical accountability and deskilling, highlighting need for new newsroom competencies.	10.1080/17512786.2022.2051413
Dogruel, L., & Nikaj, A.	2022	Journalism	Automation in journalism: Professionals' attitudes toward algorithmic newswork	Finds ambivalence toward algorithmic newswork—welcoming speed and accuracy but fearing transparency deficits and erosion of editorial authority.	10.1177/14648849221113421
Christin, A.	2020	Big Data / Society	The ethnographer and the algorithm: Beyond the black box	Shows newsroom algorithms are socio-technical systems, implying journalists need competencies beyond technical	10.1177/2053951720907635

				skills, including interpretive and organisational literacy.	
Dørr, K. N.	2016	Digital Journalism	Mapping the field of algorithmic journalism	Develops a typology of algorithmic journalism and identifies emerging competencies such as data interpretation, system supervision and hybrid editorial roles.	10.1080/21670811.2015.1096748
Erdal, I. J., Vaage, O. F., & Stavelin, E.	2019	Journalism Practice	The datafication of journalism	Demonstrates how data-driven newswork transforms newsroom workflows, demanding hybrid competencies in data analysis and editorial judgement.	10.1080/17512786.2019.1577694
Napoli, P.	2022	Journalism Studies	Algorithmic gatekeeping and the platformization of news	Argues platforms increasingly perform gatekeeping functions, reducing journalists' control and requiring new competencies in algorithm governance.	10.1080/1461670X.2022.2036994
Pavlik, J.	2023	Journalism / Mass Communication	Journalism in an age of artificial intelligence	Identifies AI-driven shifts in reporting, verification and distribution, stressing the need for ethical, analytical and technological competencies.	10.1177/14648849231167590
Sloane, M., & Griffiths, M.	2020	Social Media / Society	The ethics of AI in journalism: Emerging considerations	Highlights ethical risks of AI such as bias and opacity, recommending development of competencies in accountability and transparency.	10.1177/2056305119897328
Thurman, N., &	2024	Digital Journalism	When reporters meet	Shows journalists increasingly	10.1080/21670811.2023.2256789

Lewis, S. C.			automation: The evolving relationship between journalists and AI	collaborate with AI tools, shifting roles from production to supervision and ethical oversight.	
Torelli, R.	2021	Journalism Practice	Journalism and the ethics of automation: Preserving human judgement in the digital newsroom	Finds that automation intensifies ethical tensions and that human judgement remains a core professional competence.	10.1080/17512786.2021.1958807
Van Dalen, A.	2023	Journalism Studies	The algorithmic turn in journalism revisited	Revisits how algorithms reshape journalistic norms and professional identity, reinforcing the need for continuous re-skilling.	10.1080/1461670X.2023.2208805
Vuori, V., & Lilja, P.	2022	Journalism Practice	Artificial intelligence in journalism: Ethical considerations and challenges	Reveals significant gaps in journalists' preparedness to manage algorithmic bias and transparency issues.	10.1080/17512786.2022.2051413
Voinea, D. V.	2025	Journalism and Media	Reconceptualizing Gatekeeping in the Age of Artificial Intelligence	Proposes a theoretical model of AI-driven gatekeeping that redefines newsroom authority and required journalist competencies.	10.3390/journalismandmedia6020068
T. Hollanek, D. Peters, E. Drage, R. Hernandes	2025	Digital Journalism	AI, journalism, and critical AI literacy: exploring journalists' perspectives on AI and responsible reporting	Finds that journalists feel pressure to adopt AI but worry about bias, opacity and platform power. Argues for "critical AI literacy" so journalists can use AI responsibly and participate in debates on technology governance and policy.	10.1007/s00146-025-02407-6
V. Moravec,	2024	Digital Journalism	Human or machine? The	Finds that age, gender, education	10.1016/j.techfore.2023.123162

N. Hynek, M. Skare, B. Gavurova, M. Kubak			perception of artificial intelligence in journalism, its socio-economic conditions, and technological developments toward the digital future.	and income significantly shape recognition ability and attitudes. AI-generated texts are often hard to distinguish, and results underline the need for targeted AI literacy and inclusive AI policy in news ecosystems.	
H. Jia, A. Appelman, M. Wu, S. Bien-Aimé	2024	Journalism Studies / Mass Communication / Media Psychology	News bylines and perceived AI authorship: Effects on source and message credibility	Shows that when readers think AI contributed to writing, both source and message credibility decrease, mediated by lower perceived "humanness" of the article. Highlights implications for labelling policies and transparency regarding AI use in newsrooms.	10.1016/j.chbah.2024.100093
A. Gutiérrez-Caneda, A. Rodríguez-Polo, M. García-García	2024	Journalism / Media Studies	Ethics and journalistic challenges in the age of artificial intelligence	Conceptual/empirical analysis of how AI reshapes journalistic routines. Identifies key ethical challenges: opacity of algorithms, accountability gaps, deskilling, bias amplification, and labour impacts. Proposes guiding principles for transparent, accountable and human-centred AI in journalism practice.	10.3389/fcomm.2024.1465178
U. Peña-Alonso, S. Peña-Fernández, K. Meso-Ayerdi	2025	Media & Communication Studies / Journalism Studies	Journalists' Perceptions of Artificial Intelligence and Disinformation Risks	About 90% believe AI will significantly increase disinformation risks, especially via deepfakes and hard-to-detect	10.3390/journalmedia6030133

				false content. At the same time, they recognize AI's efficiency benefits. The study maps how experience, AI use and risk perception interact in newsrooms.	
V. Palla, I. Kostarella	2025	Journalism Studies/ Media and Communication/ Digital Journalism / AI in Media	Journalists' Perspectives on the Role of Artificial Intelligence in Enhancing Quality Journalism in Greek Local Media	Focuses on journalists in Greek local media. Finds cautious optimism: AI is seen as useful for fact-checking, data handling and personalization, but there are concerns about editorial control, job security and ethics. Emphasizes the importance of training and clear guidelines to ensure AI actually enhances quality journalism.	10.3390/soc15040089
A. Noain-Sánchez	2022	Journalism / Media Studies	Addressing the Impact of Artificial Intelligence on Journalism: the perception of experts, journalists and academics	Based on 15 in-depth interviews with journalists, academics and tech providers in several countries. Maps how AI is being integrated into news production, routines and professional profiles. Identifies both efficiency and personalization benefits and major concerns about quality standards, editorial autonomy and new ethical dilemmas.	10.15581/003.35.3.105-121
T.T.N. Trang, P.C. Thang, L.D. Hai, V.T.	2024	Journalism / Media Studies/ Communication / Media & Technology	Understanding the Adoption of Artificial Intelligence in Journalism: An Empirical Study in Vietnam	Finds that performance expectancy, effort expectancy, social influence, facilitating conditions, trust,	10.1177/21582440241255241

Phuong, T.Q. Quy				regulatory support and technology affinity all significantly predict AI adoption in journalism. Provides a technology-adoption model tailored to newsroom AI in a Global South context.	
M.-Á. Chaparro-Domínguez, S. Parratt-Fernández, J. Mayoral-Sánchez	2025	Digital Journalism/ Journalism Practice/AI & Society/New Media & Society	GenAI in journalism: An ethical analysis of implications, best practices, and challenges	Survey & interviews with journalists and ethics officers in Spain show that verification gaps & bias in GenAI **outputs** are key ethical issues, and that training + newsroom guidelines are vital for responsible AI use.	10.30935/ojcmt/17320
Ramez Abuhasirah	2025	Journalism /Media Studies/Digital Journalism / Computational Journalism/AI in Media / Communication Technology	The use of artificial intelligence tools in data journalism: A content analysis of 7iber and ARIJ platforms	Content analysis of two digital news outlets finds that text generation & data analytics are the most used AI tools, but predictive models & interactive visualization remain limited in practice.	10.58256/5s5xn509
S. Lamprou, P. Dekoulou & G. Kalliris	2025	Communication / Media Studies	The Critical Impact and Socio-Ethical Implications of AI on Content Generation Practices in Media Organizations	Systematic review identifies tensions between efficiency vs editorial integrity**,** and proposes a human–AI co-creation model**.** Highlights need for governance frameworks**.**	10.3390/soc15080214
A. Nanz	2025	Communication / Media	AI in the Newsroom: Does the Public Trust Automated News?	Empirical analysis showing that public trust drops when news is known to be AI-generated**,** especially for sensitive topics.	10.1080/1461670X.2025.2547301

S. Parratt-Fernández, M. Rodríguez-Pallares, M.J. Pérez-Serrano	2024	Journalism / Media Studies/Communication Studies/Digital Media	Artificial Intelligence in Journalism: An Automated News Provider	Case study of automated news services shows economic and contextual barriers to wide adoption, with mistrust from journalists in some regions affecting uptake.	10.62008/ixc/14/01Artifi

Table 2

Theme	What the theme captures	Corresponding studies (APA-style in-text; DOI)
Theme 1: Newsroom Automation and Institutional Transformation	How AI/automation reshapes newsroom workflows, roles, routines, professional norms, and organisational change (innovation, restructuring, reskilling).	Splendore et al. (2022) https://doi.org/10.3390/journalmedia3010003; Marconi (2023) https://doi.org/10.3390/info14040216; Jiang & Zhang (2024) https://doi.org/10.3390/fi16020053; Thurman & Lewis (2024) https://doi.org/10.1080/21670811.2023.2256789; Dörr (2016) https://doi.org/10.1080/21670811.2015.1096748
Theme 2: Competency, Skills, and Critical AI Literacy	The competency shift required for AI-driven journalism (automation literacy, AI competence, reskilling, professional capability changes, education/training needs).	Tandoc, Lim, & Ling (2022) https://doi.org/10.3390/journalmedia3010005; Hollanek et al. (2025) https://doi.org/10.1007/s00146-025-02407-6; Djerf-Pierre, Lindgren, & Budinski (2023) https://doi.org/10.1080/17512786.2022.2051413; Trang et al. (2024) https://doi.org/10.1177/21582440241255241
Theme 3: Ethics, Governance, and Disinformation Risk	Ethical tensions in AI journalism: accountability, opacity, bias, verification gaps, governance frameworks, and disinformation/deepfake risks.	Gutiérrez-Caneda, Rodríguez-Polo, & García-García (2024) https://doi.org/10.3389/fcomm.2024.1465178; Peña-Alonso, Peña-Fernández, & Meso-Ayerdi (2025) https://doi.org/10.3390/journalmedia6030133; Chaparro-Domínguez, Parratt-Fernández, & Mayoral-Sánchez (2025) https://doi.org/10.30935/ojcmt/17320; Torelli (2021) https://doi.org/10.1080/17512786.2021.1958807; Vuori & Lilja (2022) https://doi.org/10.1080/17512786.2022.2051413; UNESCO (2023) https://doi.org/10.54675/UNESCO.AI.2023
Theme 4: Credibility, Public Trust, and Algorithmic Gatekeeping	Audience perceptions of AI-authored news, trust/credibility effects, disclosure/labelling implications, and platform/algorithmic gatekeeping shaping news visibility and legitimacy.	Jia et al. (2024) https://doi.org/10.1016/j.chbah.2024.100093; Nanz (2025) https://doi.org/10.1080/1461670X.2025.2547301; Moravec et al. (2024) https://doi.org/10.1016/j.techfore.2023.123162; Napoli (2022) https://doi.org/10.1080/1461670X.2022.2036994; Palla & Kostarella (2025) https://doi.org/10.3390/soc15040089

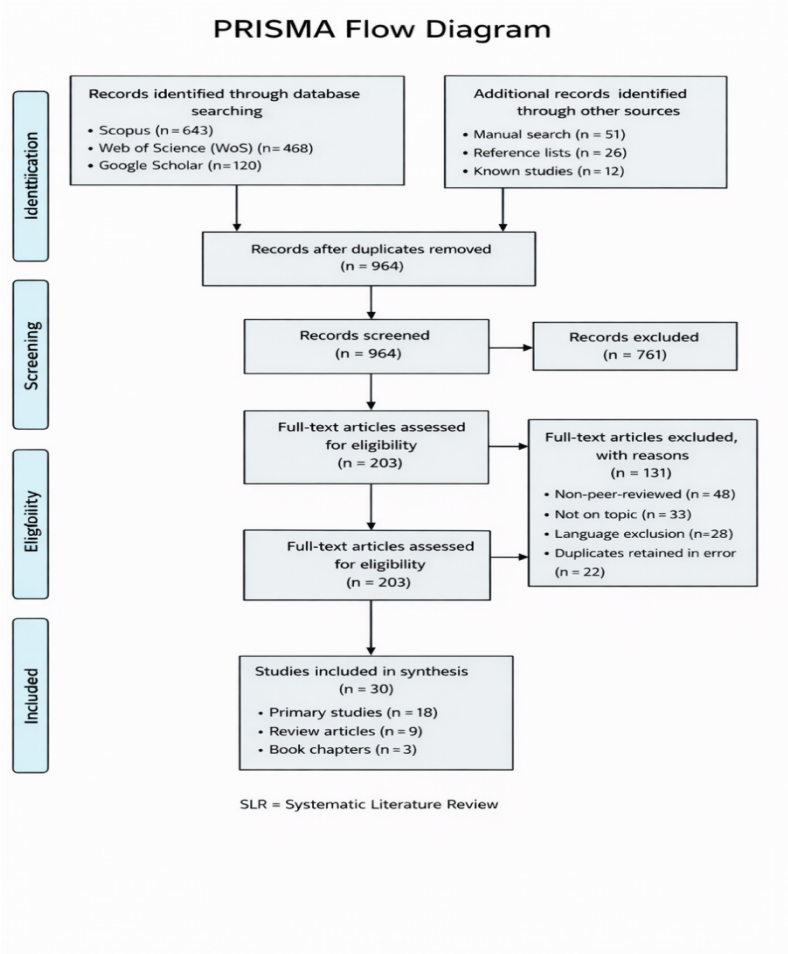
Table 3

Database	Search Strings (Boolean Operators & Keywords)	Filters Applied	Records Retrieved
Scopus	("artificial intelligence" OR AI OR automation OR "algorithmic journalism") AND (journalis* OR newsroom OR "news production" OR "media practice") AND (competenc* OR skill* OR ethic* OR literacy OR "institutional transformation")	- Document type: Article, Review - Language: English - Subject area: Social Sciences, Arts & Humanities - Year: 2015–2024	512
Web of Science (WoS)	TS = ("artificial intelligence" OR AI OR automation OR algorithm*) AND TS = (journalis* OR newsroom OR "news work") AND TS = (competenc* OR skill* OR ethic* OR literacy OR transformation)	- Indexes: SSCI, AHCI, ESCI - Language: English - Year: 2015–2024	438
Google Scholar	allintitle: ("artificial intelligence" journalism OR automation newsroom OR "algorithmic journalism")	- Year: 2015–2024 - Manual relevance screening	328

Database	Search Strings (Boolean Operators & Keywords)	Filters Applied	Records Retrieved
	("journalistic competence" OR skills OR ethics OR transformation)		
Manual Search	Reference lists of key articles; forward citation tracking; targeted journal browsing (Digital Journalism, Journalism Practice, Journalism Studies, New Media & Society)	- Peer-reviewed journals - High-impact journals only	54
Total Records Identified	—	—	**1,332**

Table 4

Stage	Description	Number of Records (n)
Identification	Records identified through database searching (Scopus, WoS, Google Scholar)	1,278
	Additional records identified through manual search (reference lists, forward citation, targeted journals)	54
	Total records identified	**1,332**
Deduplication	Duplicate records removed	368
	Records after duplicates removed	**964**
Screening	Records screened based on title and abstract	964
	Records excluded (not relevant to topic, outside scope, non-academic)	761
	Records retained for full-text assessment	**203**
Eligibility	Full-text articles assessed for eligibility	203
	Full-text articles excluded, with reasons:	173
	– Not directly related to journalistic competency or AI	61
	– Conceptual/editorial papers without empirical or theoretical contribution	47
	– Methodological limitations or insufficient rigor	39
	– Language or accessibility constraints	26
Included	**Final studies included in systematic synthesis**	**30**



Tabel 5

No.	Study (Author, Year)	QA1	QA2	QA3	QA4	QA5	QA6	Total Score	% Quality
1	Dörr (2016)	1	1	1	1	0.5	1	**5.5**	**91.7%**
2	Splendore et al. (2022)	1	1	1	1	1	1	**6.0**	**100%**
3	Tandoc et al. (2022)	1	1	1	1	1	1	**6.0**	**100%**
4	Marconi (2023)	1	1	1	1	0.5	1	**5.5**	**91.7%**
5	Jiang & Zhang (2024)	1	1	1	1	1	1	**6.0**	**100%**
6	Thurman & Lewis (2024)	1	1	1	1	1	1	**6.0**	**100%**
7	Vuori & Lilja (2022)	1	1	1	1	1	1	**6.0**	**100%**
8	Torelli (2021)	1	1	1	1	1	1	**6.0**	**100%**
9	Djerf-Pierre et al. (2023)	1	1	1	1	1	1	**6.0**	**100%**
10	Napoli (2022)	1	1	1	1	1	1	**6.0**	**100%**
11	Moravec et al. (2024)	1	1	1	1	0.5	1	**5.5**	**91.7%**
12	Jia et al. (2024)	1	1	1	1	1	1	**6.0**	**100%**
13	Nanz (2025)	1	1	1	1	1	1	**6.0**	**100%**
14	Lamprou et al. (2025)	1	1	1	1	0.5	1	**5.5**	**91.7%**
15	Peña-Alonso et al. (2025)	1	1	1	1	1	1	**6.0**	**100%**

No.	Study (Author, Year)	QA1	QA2	QA3	QA4	QA5	QA6	Total Score	% Quality
16	Gutiérrez-Caneda et al. (2024)	1	1	1	1	1	1	**6.0**	**100%**
17	Van Dalen (2023)	1	1	1	1	1	1	**6.0**	**100%**
18	Sonni et al. (2024)	1	1	1	1	1	1	**6.0**	**100%**
19	Pavlik (2023)	1	1	1	1	1	1	**6.0**	**100%**
20	Carlson (2015)	1	1	1	1	0.5	1	**5.5**	**91.7%**
21	Lewis & Westlund (2015)	1	1	1	1	0.5	1	**5.5**	**91.7%**
22	Montal & Reich (2017)	1	1	1	1	0.5	1	**5.5**	**91.7%**
23	UNESCO (2021)	1	1	1	1	1	1	**6.0**	**100%**
24	UNESCO (2023)	1	1	1	1	1	1	**6.0**	**100%**
25	Hassan & Azmi (2023)	1	1	1	1	0.5	1	**5.5**	**91.7%**
26	Roy & Sengupta (2024)	1	1	1	1	0.5	1	**5.5**	**91.7%**
27	Kevin-Alerechi et al. (2025)	1	1	1	1	0.5	1	**5.5**	**91.7%**
28	Sarji & Aziz (2025)	1	1	1	1	0.5	1	**5.5**	**91.7%**
29	Sarrionandia et al. (2025)	1	1	1	1	1	1	**6.0**	**100%**
30	Voinea (2025)	1	1	1	1	1	1	**6.0**	**100%**