Relationship between AI and political elections: a bibliometric analysis

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This study explores the application of artificial intelligence in elections, focusing on its impact on voter behavior, campaign strategies, and electoral outcomes in accordance with Science and Technology Studies. A bibliometric analysis highlights how AI shapes political processes, emphasizing emerging themes and trends in international literature. Special attention is given to the summary of key findings and the forecast for future evolutions.

Keywords: artificial intelligence; elections; politics; bibliometric analysis; electoral campaigns; Science and Technology Studies.

Relazione fra IA ed elezioni politiche: un'analisi bibliometrica

Lo studio analizza l'applicazione dell'intelligenza artificiale nelle elezioni, concentrandosi sull'impatto sui comportamenti degli elettori, sulle strategie di campagna e sui risultati elettorali in linea con gli Science and Technology Studies. Un'analisi bibliometrica evidenzia come l'IA influenzi i processi politici, rilevando temi e trend emergenti nella letteratura internazionale, con un focus sui risultati chiave e sulle prospettive future.

Parole chiave: intelligenza artificiale; elezioni; politica; analisi bibliometrica; campagne elettorali; Science and Technology Studies.

Introduction

Major elections worldwide in recent years have highlighted the growing influence of artificial intelligence on democratic processes. In 2024 alone, over 60 countries went to the polls, with new AI tools significantly impacting campaign messaging and voter outreach. While the use of digital technology in elections is not new, the rapid development of AI has introduced unprecedented opportunities and challenges. Generative AI platforms can produce convincingly realistic text, images, and videos, raising concerns about deepfakes and algorithmically tailored propaganda that may mislead voters. The World Economic Forum's Global Risks Report (2024) warns that the

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proliferation of deepfakes and other AI-generated content could erode citizens' ability to discern truth from falsehood and undermine the integrity of elections. The intersection of AI and political elections has thus become a focal point for research and public policy.

Early uses of AI in politics were limited to experimental forecasting and basic e-voting systems. By the 2010s, however, social media and big data analytics reshaped the field. The 2011 Arab Spring showed how online networks could drive protest, amplified by AI-driven trend analysis. In 2012, the U.S. presidential election marked a shift toward data-driven campaigning, anticipating AI-based voter microtargeting. In 2018 the Cambridge Analytica scandal revealed how AI-based profiling and microtargeted advertising influenced voter behavior, often without users' consent. This scandal prompted a global reckoning over data privacy and political manipulation; the European Parliamentary Research Service noted that protecting personal data and ensuring electoral fairness in the age of AI became crucial following the Cambridge Analytica case (Monteleone, 2019). Scholars in political communication observed that we have entered the "fourth wave of digital democracy", characterized by the pervasive use of AI and big data in politics, the emergence of digital platforms as influential political actors, and the normalization of falsehood as a campaign strategy.

Studying AI's role in elections is essential, as elections are the foundation of representative democracy. Any technology that shapes their administration, information flow, or voter behavior has broad societal implications. This topic regards multiple disciplines: computer scientists and data analysts develop AI models to predict outcomes, detect bots, and counter online disinformation.

This study is grounded in political sociology and Science and Technology Studies (STS), focusing on who controls technology, who benefits or is harmed, and how its use is negotiated within political institutions and norms. This perspective is crucial for understanding AI in elections as a socio-technical phenomenon involving both technical systems and human actors.

Given the rapid evolution of this research field, a bibliometric analysis provides a valuable method to systematically map the knowledge regarding AI and electoral studies.

The research objectives are descriptive and analytical. First, we aim to chart scholarly interest in AI's relationship with electoral processes: which are the most prolific authors, sources, and institutions? How has publication volume grown over time, and are there activity bursts corresponding to real-world events? Second, we analyze the literature's content to identify major research themes and trends. By quantifying bibliographic patterns and highlighting these themes, our analysis provides a structured overview of this

rapidly expanding field, which is academically valuable for identifying knowledge gaps and future research directions and is practically important for policymakers.

Section 2 provides an overview of the data and methodology. Section 3 reports the results of the analysis, such as publication trends, geographic and disciplinary distribution of research, collaboration networks, and the thematic structure of the literature. Finally, in Section 4, we summarize the main findings and reflect on their implications for scholarship and practice. We also indicate future research directions and provide considerations on ensuring that the synergy between AI and elections strengthens democratic participation.

1. Material and methods

Bibliometric analysis is a quantitative study of bibliographic material using quantitative and statistical methods to investigate knowledge structure and forecast future developments in a specific field (Maretti, Tontodimamma, Biermann, 2019).

For our analysis, we used the R (R Core Team, 2021) package Bibliometrix (Aria, Cuccurullo, 2017), designed for science mapping analysis, specifically through Biblioshiny, its associated web app.

Data were retrieved from Scopus on January 21, 2025, using the search query: ("AI" OR "artificial intelligence") AND ("election*" OR "electoral campaign*").

The asterisks ensured the query included both singular and plural forms. The Boolean operator "OR" retrieved documents containing at least one keyword from each group, while "AND" linked the two groups, focusing on documents that examine the relationship between artificial intelligence and elections. The research followed Scopus's criteria of "Article Title, Abstract, Keywords" and was restricted to the fields of Computer Science, Social Sciences, and Decision Sciences. We limited results to English documents published from 1956 to 2024, marking the start of our timeline with the Dartmouth conference that established AI as a field.

A total of 886 documents were exported in CSV format. After removing 174 unrelated items and 21 duplicates, the final dataset included 691 documents, which were imported into Biblioshiny.

2. Results

The final documents are from 284 different sources and range from 1980 to 2024. All 691 documents of the dataset were successfully accepted and processed by Biblioshiny. The analysis revealed a total of 1,533 different authors, with only 93 being authors of single-authored documents. This highlights the significant importance of co-authorship in this field, likely due to its interdisciplinary nature.

Fig. 1 - Annual scientific production

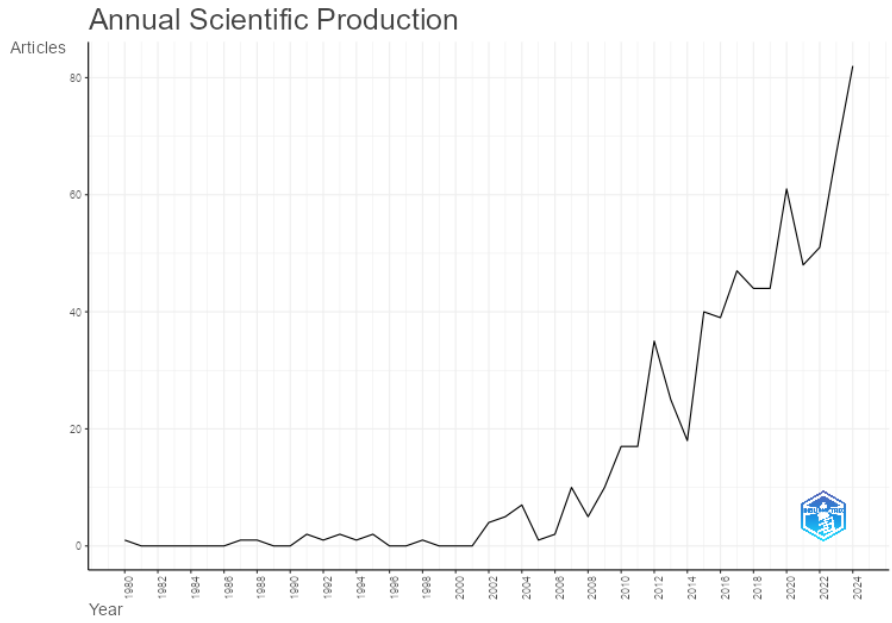


Figure 1 illustrates the annual scientific production of the documents under analysis. There was a notable increase in publications in 2012 (35 documents), likely due to the broad usage of social media during the Arab Spring in 2011 (Ranganath *et al.*, 2016) and political debates from the 2012 U.S. Presidential election. The increase in 2015 (40 documents) may be linked to the growing popularity of social networks beyond Facebook and Twitter. The rise in platforms and their use likely impacted political debates and campaigns online, fueling research on the link between technology and political processes. Moreover, the 2016 U.S. presidential election and Brexit referendum raised concerns about AI-driven misinformation, especially after the Cambridge

Analytica scandal revealed AI's role in influencing elections. García-Orosa (2021) describes this period, initiated by these events, as the beginning of the fourth wave of e-democracy.

COVID-19 further fueled technological development, evident in the peak in 2020 (61 documents). The increase in publication frequency since 2020 reflects rising academic concern about the normative implications of AI in political contexts, including voter manipulation, algorithmic bias, and democratic accountability. Since 2022, there has been a continuous rise (51 documents in 2022, 67 in 2023, and 82 in 2024) in such publications. Technological innovations have made generative AI models accessible to a broader public, increasing the interference of bots and misinformation through AI-generated fake news, images, and videos in online political debate. This has raised concerns about the outcomes of the so-called Super-Election Year in 2024 (Schmitt *et al.*, 2024), which includes the U.S. and Russian presidential elections, as well as the European Parliament elections and general elections in India and the UK, among others.

Fig. 2. - The 10 most relevant sources in our dataset

Figure 2 shows the 10 most relevant sources of our documents. The concentration in workshop and conference proceedings, such as the IJCAI, is notable. This reflects the fast-paced development in AI, where research quickly

becomes outdated, making conferences and workshops ideal for discussing advancements and receiving immediate feedback.

Fig. 3. - Country according to corresponding author

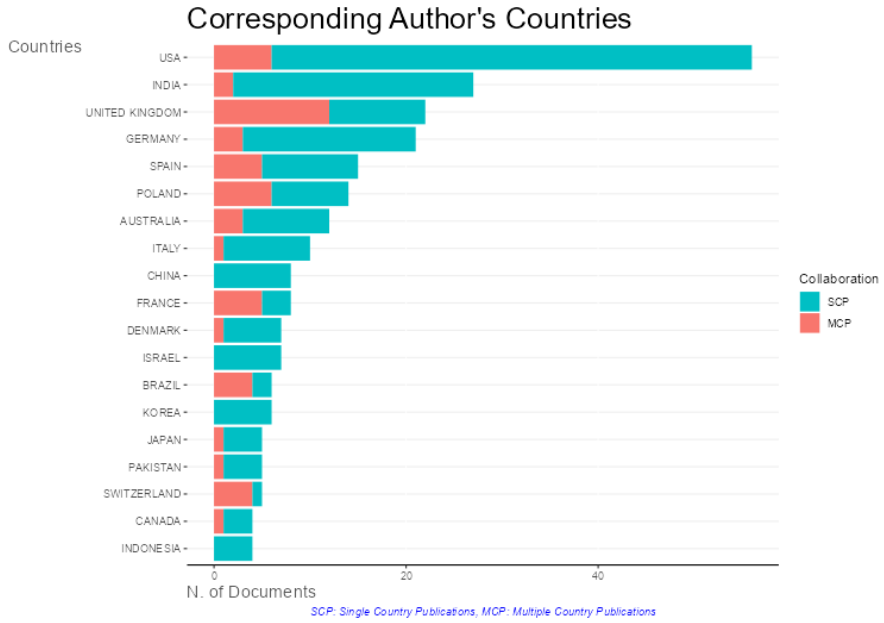
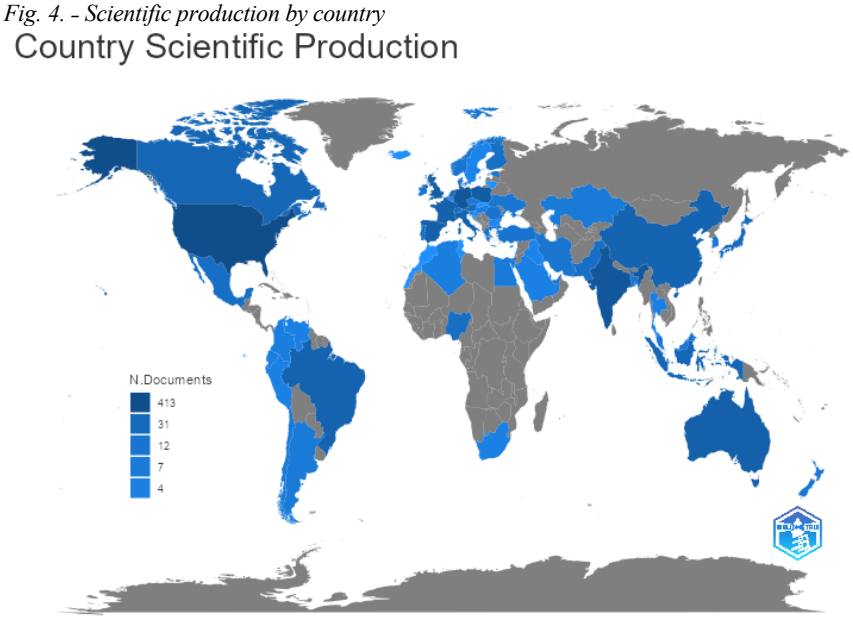


Figure 3 shows that most corresponding authors are affiliated with institutions in the U.S. This data reflects authors' institutional affiliations, not their citizenship. Single country publications (SCP), where all authors are from the same country, are far more common than multiple country publications (MCP). In the U.S., there are 50 SCPs compared to only 6 MCPs. This trend is consistent across all countries included, except for the UK, which has a slightly higher number of MCPs (12) than SCPs (10). Italy ranks 8th, with 9 SCPs and 1 MCP. Among countries with the highest presence of corresponding authors, only China, Israel, Korea, and Indonesia have no MCPs. The lower ratio of MCPs to SCPs may be influenced by regulatory differences across countries, particularly regarding AI, data privacy, and e-voting laws, which can impact international collaboration. For example, in the EU, AI is regulated by the AI Act (Cupać, Sienknecht, 2024), while China has strict requirements for government approval of generative AI models (Soo, 2025). In Indonesia, the lack of MCPs may relate to efforts in implementing the National Strategy for Artificial Intelligence announced in 2020 (Wadipalapa *et al.*, 2024).

Fig. 4. - Scientific production by country



According to Figure 4, darker colors indicate higher scientific production. The U.S. leads with 413 documents, followed by India (175), Germany (169), and the UK (102). The U.S. dominance is due to its widely used generative AI models and substantial funding for AI research. Recent U.S. presidential elections should also be considered, as they have fueled online political debates and concerns over AI-driven interference, which may have encouraged research into the connections between AI and elections. India is investing in AI to enhance its economy (Gupta, Bharadwaj, 2024). Additionally, Germany and the UK have launched ambitious AI Action Plans to promote innovation and technological leadership (European Commission, n.d.; UK Government, 2024).

Poland ranks 5th with 98 documents, likely due to its digitalization efforts supported by EU funds, specifically the European Union Digital Development Funds Program (2021-2027), amounting to 2.5 billion euros (Polish Ministry of Funds and Regional Policy, n.d.). Italy ranks 10th with 62 documents, tied with Israel. Despite substantial investments in AI development (Soo, 2025), China ranks 12th with 51 documents.

Fig. 5. - Word cloud of the top 50 Author's Keywords

We cleaned our dataset by removing research keywords, synonyms, and frequently repeated unrelated terms like "papers" and "proceedings." We then created a word cloud (Fig. 5) to visualize the top 50 most frequently occurring terms using the "Author's Keywords" option in Biblioshiny. Tab. 1 below includes the top 15 terms:

Tab. 1 - Occurrences of the top 15 Author's Keywords

Words	*Occurrences*
Machine learning	42
Social media	33
Sentiment analysis	32
Twitter	30
Fake news	18
Disinformation	16
Voting	14
Deep learning	13
Computational complexity	11
Democracy	11
Natural language processing	11
Computational social choice	10

Misinformation	9
Deepfake	8
Opinion mining	8

The analysis reveals a strong focus on "social media" and "disinformation," reflecting the significant impact of digital platforms on political discourse and the spread of misinformation. This trend is supported by the frequent occurrences of "fake news" and "deepfake," which refers to AI-generated content designed to appear authentic and often used to manipulate public opinion during political campaigns (Loewenstein, 2024). Additionally, the terms "voting" and "democracy" indicate increasing concerns about the influence of AI-generated content on democratic processes.

In the word cloud, the occurrences of "election prediction" (6), and "bots," "e-voting," and "political communication" (each with 5 occurrences) suggest a growing academic interest in how AI can forecast election outcomes and influence political communication. Furthermore, the recurrence of terms like "sentiment analysis," "deepfake," and "disinformation" suggests a shift in research focus from examining AI as a technical tool to exploring its impact on public opinion formation and the integrity of democratic processes.

Other significant terms are "voting advice applications" (5 occurrences), "political participation," "privacy" (both with 4 occurrences), and "AI ethics" (3 occurrences). The emphasis on privacy and security highlights the ethical implications of AI in elections, particularly concerning data protection and digital surveillance. Furthermore, the focus on e-voting and voting advice applications highlights efforts to boost political engagement through electronic voting tools and digital resources that help voters select candidates based on personalized responses.

Conclusion

This bibliometric analysis offers an overview of the literature on artificial intelligence and political elections. Over the past two decades, and especially since the 2010s, research on this topic has grown rapidly, with spikes around 2012 and 2015, likely linked to events such as the Arab Spring, U.S. elections, and the rise of new platforms beyond Facebook and Twitter. By 2024, publication output peaked, reflecting growing concern over AI's role in democracy. This growth pattern shows that the relationship between AI and electoral processes has become a mainstream concern.

Our analysis also highlights the interdisciplinary nature of this field. The 691 documents in our dataset were authored by 1,533 individuals, with few

single-authored works, indicating that studies often involve cross-disciplinary teams. We found a mix of computer science and social science sources, which suggests both a strong technical component in this research and a focus on normative and societal analysis. This dual character confirms that AI-and-elections research is inherently interdisciplinary, bridging algorithmic developments and their socio-political effects.

Third, the bibliometric results reveal several thematic areas of research. Our keyword co-occurrence analysis emphasizes social media and online information. Terms such as "social media," "Twitter," "sentiment analysis," "fake news," "disinformation," "misinformation," and "deepfake" are among the most frequently occurring keywords, indicating a strong interest in how AI technologies contribute to the spread and detection of false or manipulated information during elections. Terms like "fake news" and "deepfake" reflect concern about AI-driven disinformation campaigns that amplify partisan propaganda and conspiracy theories. This aligns with warnings from institutions like UNESCO and UNDP (Patel, 2025), which caution that without proper safeguards, AI could distort public discourse during elections.

Microtargeting and voter persuasion are further key themes, as demonstrated by keywords such as "machine learning," "profiling," "targeting," and "opinion mining." These studies often address the efficacy and ethics of AI-driven campaign strategies, questioning whether personalized messaging enhances voter engagement or crosses into manipulation and privacy violation.

There is also research on predictive analytics in elections. Keywords like "election prediction," "voting," "deep learning," and "computational social choice" suggest that AI models for forecasting election outcomes or optimizing electoral systems are being investigated.

Another significant theme is the exploration of AI in electoral administration and participation, evidenced by terms like "e-voting," "voting advice applications," and "political participation." These studies examine how AI can enhance voting systems by improving the security and accessibility of electronic voting or assist voters in making informed choices.

Our findings indicate an emerging focus on the ethical, legal, and sociotechnical implications of AI in elections. Keywords such as "democracy," "privacy," "AI ethics," and "regulation" signal that, although literature is primarily dominated by studies on AI's role in online political communication and information warfare, it is increasingly addressing governance, policy, and the design of AI systems aligning with democratic values.

Academic conversation has evolved in response to real-world events. Early research investigated how AI could enhance campaigns or predict elections. However, as high-profile incidents emerged, there has been more emphasis on the threats that AI poses to electoral integrity and public trust. García-Orosa

(2021) characterizes the current era as the advent of a "fourth wave of digital democracy," where digital platforms and AI-driven misinformation play a central role in politics. Cupać and Sienknecht (2024) argue that democracies are "under attack" from AI-powered techniques, such as voter profiling, automated propaganda, and troll farms, which need regulatory interventions.

The literature also notes that AI can offer solutions, from faster detection of harmful content to personalized civic education tools. This dual role has sparked debate, with many scholars calling for ways to enhance AI's benefits while mitigating risks to electoral fairness and transparency. Additionally, geographical imbalances in scholarship reflect global power disparities in AI development. Our analysis revealed that authors based in the United States and a few technologically advanced democracies produce a significant share of the research, potentially influencing which problems receive attention. There is comparatively less research from the Global South, raising concerns about underrepresented regional challenges or perspectives, highlighting the need for a more inclusive scholarship.

Looking ahead, this study highlights the need to explore AI's long-term effects on democratic culture and voter attitudes. While short-term impacts of misinformation are known, we still lack longitudinal research on whether repeated exposure erodes trust or increases polarization.

Another critical direction is to further study and evaluate regulatory and governance frameworks. In the EU, Cupać and Sienknecht (2024) identify four main instruments of AI governance: bans on certain uses, transparency requirements, risk management protocols, and digital education initiatives. Comparative research is needed to identify effective regulatory approaches and uncover existing gaps, for which interdisciplinary collaboration is essential.

Future research should also focus on the positive uses of AI in strengthening democracy, such as using machine learning to secure voting systems against fraud or cyberattacks and enhancing voter education and engagement through AI-driven chatbots. Compared to the literature on AI's threats, research on these applications is scarce. Studying pilot projects where AI has been effectively used to boost voter turnout could provide valuable insights.

Scholars should apply STS approaches to examine how election-related AI tools are developed and governed – who builds them, whose values shape them, and how their use is contested across political contexts. Qualitative methods, such as ethnographies or interviews, can shed light on these dynamics, as technologies are not neutral: they reflect human choices and power structures and must be aligned with democratic norms.

The literature on AI and political elections highlights both new opportunities and risks. By synthesizing current research, this study provides a

framework for understanding how AI is transforming electoral processes and highlights the importance of interdisciplinary collaboration to ensure that innovation supports, rather than undermines, democratic integrity.

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