
AI-Enhanced Social Sciences: A Systematic Literature Review and Bibliographic Analysis of Web of Science Published Research Papers

Muhamad Farooq*¹, Hafsa Qadir Buzdar², Saeed Muhammad³

Original Article

1. Postdoctoral Researcher Multimedia University Malaysia, Assistant Professor Emerson University Multan, Pakistan. Corresponding Author: muhammad.farooq@mmu.edu.my
2. Lecturer English National University of Modern Languages Multan, Pakistan.
Email: hafsaqadir@numl.edu.pk
3. Limkokwing University of Creative Technology, Malaysia.

Abstract

Integrating Artificial Intelligence (AI) with social sciences allows researchers to study emerging fields that link technology and mankind, encouraging change. This research examines how artificial intelligence (AI) affects sociology, psychology, economics, political science, anthropology, geography, history, education, communication studies, cultural studies, and linguistics. Additionally, it expands to cover finance, marketing, HRM, supply chain management, and IT. This study underlines the role of artificial intelligence (AI) in revolutionising research technique, offering data-driven insights from massive data, and allowing human-machine collaboration in numerous domains. This study also emphasises ethical issues and standards for appropriate AI-powered research. It also gives case studies of AI's ethical application in many sectors. A thorough review of 450 Web of Science documents underpins this study. This analysis used only English-language publications from 2019 to 2023. The selecting procedure used social science and AI keywords. The selected publications provide useful perspectives on the confluence of AI and the social sciences. This research investigates AI's role in environmental monitoring, climate change prediction, sustainable resource management, and sustainable energy, transportation, and urban planning technologies. Business and management research examines how artificial intelligence (AI) affects industries, market dynamics, financial services, supply chain management, entrepreneurship, and general management. This study also examines how artificial intelligence (AI) affects communication, art, and culture. This comprehensive analysis evaluates the major impact of artificial intelligence (AI) across numerous disciplines and identifies possible research topics where AI could improve the social sciences by solving current problems. AI-social science integration raises ethical questions and opportunities. This research also explores the effects on policy, education, and interdisciplinary cooperation, emphasising the need for ongoing dialogue and collaboration between academics, policymakers, and educators. AI-enhanced social sciences' prospective advantages for society are the subject of this essay. It also urges researchers and politicians to fully embrace AI's promise, highlighting the need for action.

Keywords: Social Science, Artificial Intelligence, Research Frontiers, Business and Economics, Research Approaches

1. Introduction

The integration of Artificial Intelligence (AI) into the realm of social sciences presents a valuable opportunity to explore emerging study fields that bridge the gap between technology and humans, hence enabling transformative advancements (Bircan & Salah, 2022). This research examines the substantial impact of artificial intelligence (AI) on several fields within the social sciences, including sociology, psychology, economics, political science, anthropology, geography, history, education, communication studies, cultural studies, and linguistics (Huang, 2022). Furthermore, it expands its range to encompass the domains of business and management, encompassing finance, marketing, human resource management (HRM), supply chain management, and information technology (IT).

Current study highlights the significance of artificial intelligence (AI) in revolutionising research technique, offering data-driven insights within the realm of extensive data, and facilitating collaboration between humans and machines across many domains (Perez et al., 2023). Furthermore, this study lays major attention on the ethical considerations and norms that are important for undertaking responsible research powered by artificial intelligence (Robila & Robila, 2020). Moreover, this resource offers case studies that effectively illustrate the ethical applications of artificial intelligence across several academic disciplines (Petit, 2023).

The research paper is founded upon a comprehensive analysis of 450 scholarly articles sourced from the Web of Science database. The publications utilised in this study were only obtained from sources in the English language and spanned a period ranging from 2019 to 2023 (Hajkovicz et al., 2023). The selection procedure encompassed the use of certain keywords related to the disciplines of social sciences and artificial intelligence. The selected papers present a rich compilation of ideas and perspectives about the intersection of artificial intelligence and the social sciences (Wang et al., 2022).

This research investigates the use of artificial intelligence (AI) in the domains of environmental monitoring and climate change prediction, sustainable resource management, and the development of sustainable technologies in energy, transportation, and urban planning. The present study emphasises the potential transformative influence of artificial intelligence (AI) in the healthcare industry, namely in domains including medical imaging, diagnostics, tailored therapy, and telemedicine (Deranty & Corbin, 2022). The analysis of the impact of artificial intelligence (AI) on various sectors, market dynamics, financial services, supply chain management, entrepreneurship, and general management is a topic of scholarly inquiry in the discipline of business and management. Moreover, this research examines the influence of artificial intelligence (AI) on communication patterns, creative expression, and the cultural implications linked to information generated by AI. This comprehensive analysis not only investigates the substantial impact of artificial intelligence (AI) on several fields of study but also outlines possible areas of research where AI might further improve the social sciences by offering solutions to current challenges (Tena-Meza et al., 2022).

The convergence of artificial intelligence (AI) and social sciences gives rise to many possibilities and ethical dilemmas that are now unfolding. Furthermore, this research investigates the implications for policy, education, and interdisciplinary cooperation, emphasising the need of ongoing dialogue and collaboration among scholars, policymakers, and educators (Graziani et al., 2023). This article outlines a prospective outlook on the future of AI-integrated social sciences, emphasising the possible advantages for societal well-being. Furthermore, it advocates for the

effective utilisation of artificial intelligence (AI) by academics and policymakers, hence highlighting the imperative for proactive measures in this field.

2. Interdisciplinary Impact of AI in Social Sciences

The convergence of artificial intelligence (AI) and social sciences is stimulating the development of inventive ideas, transforming methodology, and providing fresh perspectives on human behaviour, societal trends, and intricate phenomena (Leshkevich & Motozhanets, 2022).

The field of sociology is being enhanced by the advancements in artificial intelligence, since it allows for a more profound comprehension of human behaviour and social patterns (Zajko, 2021). By employing artificial intelligence (AI) to analyse social networks and online communities, researchers have the ability to reveal concealed patterns and dynamics. The utilisation of predictive modelling in analysing societal shifts and trends holds significant potential, since it enables proactive measures to address rising social challenges (Wang et al., 2022).

The field of artificial intelligence is witnessing significant advancements in mental health diagnoses and assistance with the integration of artificial intelligence (AI) technology. This includes the development and use of AI-based treatment chatbots and virtual counsellors (Miyazaki et al., 2023). The integration of emotion identification and sentiment analysis techniques in artificial intelligence interfaces has shown to be essential in gaining significant insights into individuals' emotional states and mental well-being.

In the field of economics, artificial intelligence (AI) is exerting a significant impact on the acceptance of technological advancements within the business and financial sectors (Liu & Lim, 2023). The utilisation of AI-driven economic models and simulations has significant value in the realm of policy research, as it enables a comprehensive understanding of complex economic dynamics. Furthermore, AI algorithms are progressively being employed for the purpose of forecasting financial markets, hence enhancing the accuracy and efficiency of such predictions (Liu & Lim, 2023).

The field of Political Science is witnessing the transformative influence of Artificial Intelligence (AI) on several aspects of politics and administration (Swidler, 2023). AI-enhanced decision support systems play a crucial role in assisting policymakers in making well-informed and evidence-based choices. Additionally, the use of AI-driven political campaign plans and analyses provides a data-centric approach to the field of politics (Díaz & Boj, 2023).

Anthropology plays a significant role in shaping the ethical framework and cultural dimensions of artificial intelligence (AI) (Vogel, 2021). The need of developing ethical frameworks for artificial intelligence (AI) that are specifically designed to address cultural sensitivities cannot be overstated. Furthermore, the utilisation of AI applications is making a significant contribution towards the safeguarding and conservation of indigenous knowledge and cultural heritage (Vogel, 2021).

In the field of geography, artificial intelligence (AI) is being utilised to augment urban planning and provide more efficient resource management (Miao et al., 2021). The use of AI-driven traffic management and sustainability solutions has demonstrated significant advancements in enhancing the quality of urban living (Miao et al., 2021). The artificial intelligence utilization context of geospatial data analysis plays a substantial role in improving disaster response strategies and resource allocation (Miao et al., 2021).

The field of history is enhanced by the use of artificial intelligence through the application of historical data analysis and preservation techniques (Bodó & Janssen, 2022; Gupta et al., 2018). The utilisation of artificial intelligence (AI) in the process of digitising and analysing historical documents offers valuable insights into bygone eras (Daud et al., 2022). AI-enhanced virtual historical reconstructions provide users with immersive experiences that allow them to engage with historical contexts.

The field of education is being positively impacted by the advancements in artificial intelligence, as it is enhancing both educational technology and pedagogical practices (Shapiro et al., 2023). Personalised artificial intelligence (AI) instructors and adaptive learning systems are designed to address the unique requirements of individual students, while AI-powered assessment tools offer impartial evaluations of student achievement (Baker et al., 2023).

The field of communication studies is being significantly influenced by artificial intelligence (AI), particularly in the areas of content development and social media (Bhagtani & Khatana, 2022). The utilisation of artificial intelligence (AI) in content production carries significant ramifications for society, particularly as AI's involvement in policing online communication and ensuring compliance and safety continues to expand (Scendoni et al., 2023).

The field of Cultural Studies examines the impact of artificial intelligence on creative and cultural forms of expression (Scendoni et al., 2023). The cultural relevance of AI-generated art and literature is noteworthy. Furthermore, artificial intelligence (AI) assumes a significant role in the preservation and revitalization of cultural assets through using digital technologies (Bitonti, 2023).

Linguistics plays a crucial role in the development and advancement of natural language processing and comprehension (Gardner et al., 2019; Shahid et al., 2022). The utilisation of artificial intelligence in language translation and cross-lingual communication has resulted in increased accessibility in the realm of communication. Artificial intelligence (AI) is also playing a significant role in enhancing our comprehension of regional dialects and accents (Hamal et al., 2022).

The integration of AI is facilitating the use of approaches which are AI driven in corporate strategy and operations of businesses around the world (Chaudhry et al., 2023). The integration of artificial intelligence (AI) into corporate intelligence and decision-making processes has been shown to significantly boost an organization's competitive advantage (Yuan et al., 2023). The function of artificial intelligence (AI) in market analysis and consumer segmentation is of utmost importance in the development and implementation of targeted strategies (Tunca et al., 2023).

The field of management is now undergoing transformation as a result of the integration of artificial intelligence (AI) (Bitonti, 2023). This integration is evident in the use of AI-driven tools that aid in decision-making processes and the implementation of strategic initiatives (Almufarreh & Arshad, 2023). AI plays a significant role in enhancing organisational agility and promoting innovation (Ameen et al., 2021).

The field of finance benefits from the integration of artificial intelligence (AI) since it improves financial analysis and decision-making through the utilisation of AI-powered risk assessment models (Ma, 2023). The utilisation of artificial intelligence (AI) in portfolio management and algorithmic trading is advantageous due to its predictive capabilities.

The utilisation of artificial intelligence (AI) plays a significant role in the field of marketing by providing valuable insights for market research and analysis of consumer behaviour. This, in turn, contributes to the development of AI-enhanced marketing campaigns and the provision of personalised product suggestions (Hussain & Ayob, 2023).

The field of Human Resource Management is greatly influenced by advancements in AI. These advancements in HRM have led to the use of AI-driven recruiting methods and employee retention programmes, which have significantly improved HR practises, talent management, and workforce planning. AI also contributes to the augmentation of workplace diversity and inclusion (Alan, 2023).

The optimisation of supply chain operations and logistics is achieved by the implementation of artificial intelligence (AI) techniques. The area is being transformed by the use of AI-driven solutions for supply chain forecasting, demand planning, risk management, and sustainability (Chen & Biswas, 2021).

The field of Information Technology (IT) is subject to the effect of Artificial Intelligence (AI), particularly in relation to IT infrastructure and cybersecurity. The use of artificial intelligence (AI) in the realm of cybersecurity contributes to the improvement of information technology (IT) security by bolstering threat detection and response capabilities. Artificial intelligence (AI) plays a significant role in enhancing the efficiency of IT resource allocation and network management (Huang & Zhong, 2023).

In conclusion, this extensive analysis highlights the significant influence of artificial intelligence (AI) in several fields of social science and emphasises the promising opportunities for further investigation in each respective domain. Researchers, policymakers, and educators have the opportunity to negotiate the dynamic and ever-changing terrain of artificial intelligence (AI), seeking inspiration from its significant and transformational impacts on the field of social sciences.

Area	Impact on AI	Possible Areas of Research
Sociology	Understanding human behavior and societal trends	- AI-driven analysis of social networks and online communities. - Predictive modeling of societal shifts and trends.
Psychology	Advancing AI-driven mental health diagnostics and support	- AI-based therapy chatbots and virtual counselors. - Emotion recognition and sentiment analysis for AI interfaces.
Economics	Influencing AI adoption in business and finance sectors.	- AI-driven economic models and simulations for policy analysis. - Forecasting financial markets using AI algorithms.
Political Science	Shaping AI applications in politics and governance.	- AI-enhanced decision support systems for policymakers. - AI-driven political campaign strategies and analysis.
Anthropology	Informing AI ethics and cultural considerations.	- Ethical AI frameworks for culturally sensitive contexts. - AI applications in preserving indigenous knowledge.
Geography	Enhancing AI for urban planning and resource management.	- AI-driven traffic management and urban sustainability. - Geospatial data analysis for disaster response with AI.

History	Leveraging AI for historical data analysis and preservation.	<ul style="list-style-type: none"> - AI-powered historical document digitization and analysis. - AI-enhanced virtual historical reconstructions.
Education	Advancing AI in educational technology and pedagogy.	<ul style="list-style-type: none"> - Personalized AI tutors and adaptive learning platforms. - AI-driven assessment tools for student performance.
Communication Studies	Shaping AI-driven content generation and social media.	<ul style="list-style-type: none"> - AI-generated content creation and its societal impact. - AI in moderating online communication and content.
Cultural Studies	Influencing AI's role in artistic and cultural expression.	<ul style="list-style-type: none"> - AI-generated art and literature and its cultural significance. - AI in preserving and revitalizing cultural heritage.
Linguistics	Informing natural language processing and understanding.	<ul style="list-style-type: none"> - AI-driven language translation and cross-lingual communication. - AI in understanding regional dialects and accents.
Business	Driving AI adoption in corporate strategy and operations.	<ul style="list-style-type: none"> - AI applications in business intelligence and decision-making. - AI in market analysis and customer segmentation.
Management	Shaping AI leadership and organizational management.	<ul style="list-style-type: none"> - AI-driven tools for management decision support and strategy. - AI-enhanced leadership and team dynamics.
General Management	Influencing AI applications in general business practices.	<ul style="list-style-type: none"> - AI-driven approaches to resource allocation and optimization. - AI in improving organizational agility and innovation.
Finance	Enhancing AI's role in financial analysis and decision-making.	<ul style="list-style-type: none"> - AI-driven risk assessment models for investment and lending. - AI in portfolio management and algorithmic trading.
Marketing	Informing AI applications in market research and consumer behavior.	<ul style="list-style-type: none"> - AI-enhanced marketing campaigns and personalized product recommendations. - AI in understanding and predicting consumer preferences.
Human Resource Management	Advancing AI in HR practices, talent management, and workforce planning.	<ul style="list-style-type: none"> - AI-driven recruitment and employee retention strategies. - AI in enhancing workplace diversity and inclusion.
Supply Chain Management	Optimizing supply chain operations and logistics through AI.	<ul style="list-style-type: none"> - AI-driven supply chain forecasting and demand planning. - AI in supply chain risk management and sustainability.
Information Technology (IT)	Influencing AI applications in IT infrastructure and cybersecurity.	<ul style="list-style-type: none"> - AI-driven cybersecurity threat detection and response. - AI in optimizing IT resource allocation and network management.

4. Ethical AI in Scientific Research

The integration of artificial intelligence (AI) into scientific study gives rise to a plethora of ethical problems. In order to effectively navigate the ethical dilemmas associated with artificial intelligence (AI) in scientific research, it is imperative to establish comprehensive rules and frameworks that promote responsible behaviour (Tigard et al., 2023). This study investigates the development of ethical norms and principles that have been formulated to provide guidance to researchers in their use of artificial intelligence (AI) technology (Koplin, 2023). This is an examination of the ethical standards pertaining to artificial intelligence (AI) that are advocated by several academic institutions, governmental entities, and international organisations (Breuer et al., 2023).

The ethical considerations surrounding the utilisation of artificial intelligence (AI) in scientific research are of utmost importance, as they serve the dual purpose of upholding the integrity of research findings and cultivating trust among various stakeholders, participants, and the wider public (Kempt & Nagel, 2023).

5. AI-Enhanced Environmental Monitoring

The environment is being confronted with unparalleled difficulties, encompassing climate change, deforestation, and the loss of habitats (Casiraghi, 2023). This study investigates the many uses of artificial intelligence (AI) in the processing of extensive environmental information, the monitoring of weather patterns, and the prediction of long-term climate changes (Greene et al., 2023). Artificial intelligence (AI) provides academics and environmental organisations with important tools that enhance their comprehension and resolution of crucial environmental concerns.

The capacity of artificial intelligence to analyse vast and intricate environmental information is a transformative development in the field of environmental science. This study explores the sophisticated data analytics approaches driven by artificial intelligence (AI), including machine learning and deep learning. These technologies facilitate the extraction of practical insights from a wide range of environmental data sources, such as satellite images, sensor networks, and climate models (Huang & Zhong, 2023). In addition, we explore the possibilities of early warning systems and adaptive resource management that leverage AI-driven data.

The prioritisation of sustainable resource management is of utmost importance in safeguarding the long-term well-being of our planet. In this study, we investigate the ways in which artificial intelligence (AI) contributes to the optimisation of natural resource management, encompassing the domains of water, forests, and animals. The utilisation of AI-driven solutions is facilitating enhanced resource allocation, conservation endeavours, and the implementation of sustainable practices (Baker et al., 2023). This study investigates practical instances of artificial intelligence (AI) implementations in the field of resource management, with a focus on their capacity to effectively tackle urgent global sustainability issues.

The use of artificial intelligence (AI) into the field of environmental monitoring is a potential avenue for achieving a more sustainable and resilient future.

6. Human-Machine Collaboration

In the current epoch characterised by the growing integration of artificial intelligence (AI) into scientific inquiry, the cultivation of efficient collaboration between human researchers and machine counterparts has paramount importance (Gupta et al., 2023). This study explores the many methods through which artificial intelligence enhances human talents, optimises research procedures, and fosters multidisciplinary cooperation (Kokotinis et al., 2023). The utilisation of

artificial intelligence (AI) in research is revolutionising the scientific community's approach, including several aspects such as data processing and hypothesis creation.

The capacity of artificial intelligence (AI) to effectively analyse and comprehend extensive information holds significant ramifications for decision-making processes and the exploration of knowledge (Kokotinis et al., 2023). This study investigates the role of artificial intelligence (AI) in supporting researchers in their decision-making processes by utilising data-driven approaches, detecting trends, and revealing latent insights (Srivastava et al., 2023). The use of case studies and examples serves to demonstrate the ways in which artificial intelligence algorithms play a role in facilitating well-informed decision-making processes and expediting the rate of scientific advancements across a wide range of disciplines.

The prevalence of interdisciplinary study has been on the rise, mostly due to the emergence of intricate scientific inquiries that surpass conventional academic boundaries. In this discourse, we investigate the transformative impact of collaborative artificial intelligence (AI) systems on multidisciplinary research (Zenni & Andrew, 2023). These platforms enable the exchange of knowledge, promote interdisciplinary dialogue, and assist the integration of varied areas of expertise. In this discourse, we explore the capacity of artificial intelligence (AI) to dismantle barriers across different fields of scientific inquiry and foster advancements at the crossroads of several disciplines (Zenni & Andrew, 2023).

The partnership between humans and machines is significantly transforming the domain of scientific study. This section elucidates the mutually beneficial association between researchers and AI systems, underscoring the capacity of AI to augment scientific efficacy, facilitate interdisciplinary collaboration, and catalyse revolutionary advancements (Roy et al., 2023).

7. AI in Healthcare and Medical Imaging

The healthcare sector is now experiencing a significant paradigm shift as a result of the incorporation of artificial intelligence (AI) technology. Within this part, we explore the many uses of artificial intelligence (AI) in the field of healthcare (Wang et al., 2022). Artificial intelligence (AI) is playing a pivotal role in enhancing the efficiency and accessibility of healthcare by simplifying administrative chores and transforming patient care. This study examines the advancements in healthcare administration, resource allocation, and patient involvement facilitated by artificial intelligence (AI), with a focus on the possible enhancements in healthcare outcomes and cost reduction.

8. AI and Sustainable Technologies

Artificial Intelligence (AI) has emerged as a significant catalyst in effectively tackling pressing global concerns, with a special focus on sustainability and the preservation of the environment. This section explores the significant contribution of artificial intelligence (AI) in promoting the development of sustainable technology in several fields (Frehywot & Vovides, 2023a).

The Significance of AI in Sustainable Energy: The influence of artificial intelligence on sustainable energy solutions is substantial. Machine learning algorithms are currently being employed to optimise energy consumption, improve grid management, and forecast energy demand (Karinshak & Jin, 2023). AI-driven models play a pivotal role in enabling the seamless integration of renewable energy sources, such as solar and wind power, into established energy networks, hence enhancing the efficiency and sustainability of energy distribution (Frehywot & Vovides, 2023b).

The Evolution of Transportation: The transportation industry is currently through a transformative phase driven by the advancements in artificial intelligence (AI). Artificial intelligence (AI) is playing a transformative role in the transportation sector, with advancements such as autonomous cars that effectively mitigate pollutants and alleviate traffic congestion, as well as AI-driven traffic control systems. This technology is significantly redefining the trajectory of transportation in the foreseeable future (Dwivedi et al., 2023). The application of artificial intelligence (AI) in the transportation industry has been associated with several positive effects, including the development of sustainable mobility solutions and the reduction of carbon footprints (Marquez et al., 2023a).

The Significance of AI in Smart Urban Planning: Artificial intelligence (AI) assumes a crucial role in the domain of smart urban planning by effectively optimising the allocation of resources and improving the overall quality of life within urban environments (Dwivedi et al., 2023). The use of AI-driven simulations and data analytics plays a crucial role in enabling city planners to make well-informed decisions pertaining to infrastructure development, waste management, and public transit. Smart cities utilise artificial intelligence (AI) technologies to establish environmentally sustainable and highly habitable urban areas (Marquez et al., 2023b).

Artificial intelligence (AI) powered solutions play a crucial role in enhancing the efficiency of resource allocation in many industries (Liao et al., 2023). The agricultural sector derives advantages from the use of AI-driven precision farming techniques, which effectively reduce water and pesticide consumption while simultaneously optimising crop productivity. The field of forestry management utilises artificial intelligence (AI) techniques to effectively monitor the health of forests and anticipate the occurrence of wildfires. AI is utilised in conservation initiatives to save biodiversity and preserve natural environments.

The Role of Artificial Intelligence in Facilitating the Transition to a Circular Economy: Artificial intelligence (AI) plays a crucial role in facilitating the transition to a circular economy through its ability to promote recycling practises and effectively reduce waste. The utilisation of AI-driven robots and systems has been shown to improve the efficiency of sorting recyclable materials, resulting in a reduction in contamination and waste within recycling operations (Liao et al., 2023). In addition to resource conservation, the practise also contributes to the mitigation of environmental consequences associated with garbage disposal.

The use of AI-driven predictive maintenance and energy management systems in manufacturing operations results in the optimisation of processes, hence contributing to the reduction of energy consumption and minimising resource wastage. Smart factories utilise artificial intelligence (AI) technologies to mitigate production-related emissions and optimise sustainability outcomes.

9. Future Prospects and Challenges

The incorporation of Artificial Intelligence (AI) inside the realm of social sciences has presented novel opportunities, hence paving the way for several prospective avenues in this domain (Kua, 2023).

The integration of artificial intelligence (AI) and social sciences will facilitate enhanced cooperation among computer scientists, social scientists, and domain specialists. The integration of many disciplines will result in enhanced research endeavours, enabling a more thorough examination of intricate social problems that were previously difficult to address within isolated academic fields (Page & Duignan, 2023).

With the increasing integration of artificial intelligence (AI) applications into social research, there will be an escalating need for AI systems that offer comprehensible explanations for the judgements they make. The significance of Explainable AI (XAI) will increase, hence assuring openness, accountability, and ethical scrutiny in AI-driven research across many disciplines (Kua, 2023).

Governments and policymakers are expected to progressively utilise AI-driven data analytics as a means to enhance their decision-making processes. Artificial intelligence (AI) is poised to assume a crucial role in influencing policies pertaining to healthcare, urban planning, social welfare, and several other domains, hence facilitating governance that is grounded on empirical data (Page & Duignan, 2023).

The field of education is poised for a substantial revolution as it embraces AI-driven platforms that are designed to cater to the unique requirements of each student. The prevalence of adaptive learning systems is expected to increase, as they offer personalised learning experiences that have the potential to enhance educational results (Gilbert et al., 2023).

8.2 Emerging Challenges and Ethical Dilemmas

The potential of AI-enhanced social sciences holds promise for the future, although it is accompanied by a number of problems and ethical concerns that warrant attention. The persistent difficulty of mitigating prejudice in artificial intelligence models. The issue of achieving equity in artificial intelligence (AI) systems among various demographic cohorts remains a multifaceted one that needs continuous investigation and resolution. The ethical consideration of reconciling the benefits of AI-driven research with the protection of individuals' privacy rights is a pressing issue. It is imperative for researchers to devise robust methodologies for data anonymization in order to safeguard sensitive information (Emmert-Streib, 2021).

The concepts of accountability and transparency are of utmost importance in various contexts. The establishment of accountability and transparency in decision-making processes powered by artificial intelligence (AI) is of paramount importance. This entails comprehending the mechanisms through which AI models reach conclusions and rendering these procedures available and clear to relevant parties.

The availability of a wide range of datasets is crucial for conducting impactful social science research utilising artificial intelligence. Achieving a harmonious equilibrium between the accessibility of data and the preservation of privacy will pose an enduring and ongoing problem (Emmert-Streib, 2021).

The findings of this study have significant implications for several domains, including policy, education, and interdisciplinary collaboration. These implications highlight the potential impact of the study's results on these areas and underscore the need of considering them in future endeavors. In terms of policy, the study's findings shed light on key in order to properly address these possibilities and obstacles, it becomes apparent that certain consequences arise:

It is imperative for policymakers to establish all-encompassing policy frameworks that regulate conscientious AI research and its ethical implementation within social settings. It is imperative that these regulations prioritise the principles of justice, openness, accountability, and data privacy (Sayed et al., 2023).

It is imperative for educational institutions to incorporate AI literacy and ethical training into their curricula. This initiative aims to equip upcoming social scientists, politicians, and individuals with the necessary skills and knowledge to ethically traverse the realm of artificial intelligence.

The promotion of collaborative hubs and research centres will enhance the conduct of cross-disciplinary research. These hubs will function as forums for the convergence of social scientists, computer scientists, and domain specialists, facilitating the seamless integration of artificial intelligence into the field of social sciences.

In summary, the potential advancements of AI-integrated social sciences provide significant opportunities, while also present intricate ethical dilemmas. To effectively tackle these difficulties, it is imperative to adopt a comprehensive strategy that encompasses the formulation of policies, implementation of educational reforms, and fostering multidisciplinary collaboration. This approach is essential in order to fully leverage the potential of artificial intelligence (AI) for the advancement of society and scientific research.

10. Conclusion

The advent of artificial intelligence (AI) has brought about a significant transformation in the realm of social sciences, fundamentally altering the approaches to conducting research and providing researchers with enhanced capabilities to investigate intricate societal issues.

The utilisation of artificial intelligence (AI) in several fields, including but not limited to environmental monitoring, healthcare, sustainable technology, and multidisciplinary cooperation, is revolutionising the approach to tackling significant societal challenges.

The profound impact of artificial intelligence (AI) on the field of social sciences should not be underestimated. Artificial intelligence (AI) provides academics with a range of tools and approaches that enable them to effectively analyse extensive datasets, identify concealed patterns, and acquire more profound understandings of human behaviour and social dynamics. Furthermore, artificial intelligence (AI) facilitates multidisciplinary cooperation by bridging the divide between traditionally separate areas and encouraging novel approaches to enduring problems.

In light of the imminent AI-driven revolution in the field of social sciences, we thus extend a call to action to both scholars and policymakers.

Academics are encouraged to adopt the ethical use of artificial intelligence (AI) in their research endeavours, giving precedence to principles of justice and openness. Additionally, fostering interdisciplinary collaboration is seen essential for effectively tackling intricate social challenges.

It is imperative for policymakers to establish comprehensive frameworks that effectively regulate the field of AI research and ensure its appropriate integration within policy areas. The implementation of these frameworks should prioritise the protection of privacy, establishment of mechanisms for accountability, and facilitation of fair and just utilisation of AI technology.

In summary, the incorporation of artificial intelligence (AI) into the realm of social sciences gives a noteworthy prospect for enhancing our comprehension of societal dynamics and effectively tackling urgent worldwide issues. As academics and policymakers, we have a duty to approach this uncharted territory with prudence, anticipation, and a dedication to enhancing societal welfare.

References

- Alan, H. (2023). A Systematic Bibliometric Analysis on the Current Digital Human Resources Management Studies and Directions for Future Research. *JOURNAL OF CHINESE HUMAN RESOURCES MANAGEMENT*, 14(1), 38–59. <https://doi.org/10.47297/wspchrmWSP2040-800502.20231401> WE - Emerging Sources Citation Index (ESCI)
- Almufarreh, A., & Arshad, M. (2023). Promising Emerging Technologies for Teaching and Learning: Recent Developments and Future Challenges. *Sustainability (Switzerland)*, 15(8). <https://doi.org/10.3390/su15086917>
- Ameen, N., Tarhini, A., Reppel, A., Anand, A., Asare, E., Burton, B., Dunne, T., Bhubaneswar, A., Blut, M., Wang, C., Wang, C., Cervantes, A. V., Franco, A., Chen, Y., Mandler, T., Meyerwaard, L., Chinomona, R., Poee, D., Collier, J. E., ... Mahmoudi, R. (2021). Can Internet of Things serve as an effective marketing endeavor in building brand loyalty. *Number*, 4(4).
- Ampofo, J. W., Emery, C. V., & Ofori, I. N. (2023). Assessing the Level of Understanding (Knowledge) and Awareness of Diagnostic Imaging Students in Ghana on Artificial Intelligence and Its Applications in Medical Imaging. *Radiology Research and Practice*, 2023, 1–9. <https://doi.org/10.1155/2023/4704342>
- Anderson, C., Heinisch, J. S., Deldari, S., Salim, F., Ohly, S., David, K., & Pejovic, V. (2023). Toward Social Role-Based Interruptibility Management. *IEEE Pervasive Computing*, 22(1), 59–68. <https://doi.org/10.1109/MPRV.2022.3229905>
- Avnoon, N., Kotliar, D. M., & Rivnai-Bahir, S. (2023). Contextualizing the ethics of algorithms: A socio-professional approach. *New Media and Society*. <https://doi.org/10.1177/14614448221145728>
- Baker, B., Mills, K. A., McDonald, P., & Wang, L. (2023). AI, Concepts of Intelligence, and Chatbots: The “Figure of Man,” the Rise of Emotion, and Future Visions of Education. *TEACHERS COLLEGE RECORD*, 125(6), 60–84. <https://doi.org/10.1177/01614681231191291> WE - Social Science Citation Index (SSCI)
- Balbi, S., Bagstad, K. J., Magrach, A., Sanz, M. J., Aguilar-Amuchastegui, N., Giupponi, C., & Villa, F. (2022). The global environmental agenda urgently needs a semantic web of knowledge. *Environmental Evidence*, 11(1). <https://doi.org/10.1186/s13750-022-00258-y>
- Bhagtani, H., & Khatana, S. S. (2022). Influence of Social Media and Internet on Children Education With Rising Cybercrimes: An overview. *International Journal of Early Childhood Special Education*, 14(2), 4742–4747. <https://doi.org/10.9756/INT-JECSE/1412.525> WE - Emerging Sources Citation Index (ESCI)
- Bircan, T., & Salah, A. A. A. (2022). A Bibliometric Analysis of the Use of Artificial Intelligence Technologies for Social Sciences. *Mathematics*, 10(23). <https://doi.org/10.3390/math10234398>
- Bitonti, A. (2023). Tools of digital innovation in public affairs management: A practice-oriented analysis. *JOURNAL OF PUBLIC AFFAIRS*. <https://doi.org/10.1002/pa.2888>
- Bodó, B., & Janssen, H. (2022). Maintaining trust in a technologized public sector. *Policy and Society*, 41(3), 414–429. <https://doi.org/10.1093/polsoc/puac019>
- Breuer, S., Braun, M., Tigard, D., Buyx, A., & Müller, R. (2023). How Engineers’ Imaginaries of Healthcare Shape Design and User Engagement: A Case Study of a Robotics Initiative for Geriatric Healthcare AI Applications. *ACM Transactions on Computer-Human Interaction*, 30(2), 1–33. <https://doi.org/10.1145/3577010>

- BuHamdan, S., Alwisy, A., Danel, T., Bouferguene, A., & Lafhaj, Z. (2022). The use of reinforced learning to support multidisciplinary design in the AEC industry: Assessing the utilization of Markov Decision Process. *International Journal of Architectural Computing*, 20(2), 216–237. <https://doi.org/10.1177/14780771211069999>
- Casiraghi, S. (2023). Anything new under the sun? Insights from a history of institutionalized AI ethics. *Ethics and Information Technology*, 25(2). <https://doi.org/10.1007/s10676-023-09702-0>
- Chaudhry, I. S., Sarwary, S. A. M., El Refae, G. A., & Chabchoub, H. (2023). Time to Revisit Existing Student's Performance Evaluation Approach in Higher Education Sector in a New Era of ChatGPT — A Case Study. *Cogent Education*, 10(1). <https://doi.org/10.1080/2331186X.2023.2210461>
- Chen, Y., & Biswas, M. I. (2021). Turning crisis into opportunities: How a firm can enrich its business operations using artificial intelligence and big data during covid-19. *Sustainability (Switzerland)*, 13(22). <https://doi.org/10.3390/su132212656>
- Daud, A., Islam, N. ul, Li, X., Razzak, I., & Hayat, M. K. (2022). Identifying Rising Stars via Supervised Machine Learning. *IEEE Transactions on Computational Social Systems*. <https://doi.org/10.1109/TCSS.2022.3178070>
- Deranty, J. P., & Corbin, T. (2022). Artificial intelligence and work: a critical review of recent research from the social sciences. *AI and Society*. <https://doi.org/10.1007/s00146-022-01496-x>
- Díaz, D., & Boj, C. (2023). A critical approach to Machine Learning forecast capabilities: creating a predictive biography in the age of the Internet of Behaviour (IoB). *Artnodes*, 2023(31). <https://doi.org/10.7238/artnodes.v0i31.405249>
- Douet Vannucci, V., Marchand, T., Hennequin, A., Caci, H., & Staccini, P. (2023). The EPIDIA4Kids protocol for a digital epidemiology study on brain functioning in children, based on a multimodality biometry tool running on an unmodified tablet. *Frontiers in Public Health*, 11. <https://doi.org/10.3389/fpubh.2023.1185565>
- Dwivedi, Y. K., Sharma, A., Rana, N. P., Giannakis, M., Goel, P., & Dutot, V. (2023). Evolution of artificial intelligence research in Technological Forecasting and Social Change: Research topics, trends, and future directions. *Technological Forecasting and Social Change*, 192. <https://doi.org/10.1016/j.techfore.2023.122579>
- El Sayed, S., Al-Hababi, R., & Rahman, M. M. (2023). Gulf Studies: The Imperatives of Area Studies in the Gulf Region. *SOCIAL SCIENCES-BASEL*, 12(5). <https://doi.org/10.3390/socsci12050261> WE - Emerging Sources Citation Index (ESCI)
- Emmert-Streib, F. (2021). From the Digital Data Revolution toward a Digital Society: Pervasiveness of Artificial Intelligence. *Machine Learning and Knowledge Extraction*, 3(1), 284–298. <https://doi.org/10.3390/make3010014>
- Frehywot, S., & Vovides, Y. (2023a). An equitable and sustainable community of practice framework to address the use of artificial intelligence for global health workforce training. *Human Resources for Health*, 21(1). <https://doi.org/10.1186/s12960-023-00833-5>
- Frehywot, S., & Vovides, Y. (2023b). An equitable and sustainable community of practice framework to address the use of artificial intelligence for global health workforce training. *HUMAN RESOURCES FOR HEALTH*, 21(1). <https://doi.org/10.1186/s12960-023-00833-5> WE - Social Science Citation Index (SSCI)
- Gardner, M., Grus, J., Neumann, M., Tafford, O., Dasigi, P., Liu, N. F., Peters, M., Schmitz, M., & Zettlemoyer, L. (2019). AllenNLP: A Deep Semantic Natural Language Processing Platform.

In *NLP OPEN SOURCE SOFTWARE (NLP-OSS)* (Issue Workshop on NLP Open Source Software (NLP-OSS), pp. 1–6). <https://doi.org/10.18653/v1/w18-2501>

Gilbert, D. U., Rasche, A., Schormair, M. J. L., & Singer, A. (2023). Guest Editors' Introduction: The Challenges and Prospects of Deliberative Democracy for Corporate Sustainability and Responsibility. *BUSINESS ETHICS QUARTERLY*, 33(1), 1–25. <https://doi.org/10.1017/beq.2022.35> WE - Social Science Citation Index (SSCI)

Graziani, M., Dutkiewicz, L., Calvaresi, D., Amorim, J. P., Yordanova, K., Vered, M., Nair, R., Abreu, P. H., Blanke, T., Pulignano, V., Prior, J. O., Lauwaert, L., Reijers, W., Depeursinge, A., Andrearczyk, V., & Müller, H. (2023). A global taxonomy of interpretable AI: unifying the terminology for the technical and social sciences. *Artificial Intelligence Review*, 56(4), 3473–3504. <https://doi.org/10.1007/s10462-022-10256-8>

Greene, C. (2023). AI and the Social Sciences: Why All Variables are Not Created Equal. *Res Publica*, 29(2), 303–319. <https://doi.org/10.1007/s11158-022-09544-5>

Greene, T., Dhurandhar, A., & Shmueli, G. (2023). Atomist or holist? A diagnosis and vision for more productive interdisciplinary AI ethics dialogue. *Patterns*, 4(1). <https://doi.org/10.1016/j.patter.2022.100652>

Gupta, P., Nguyen, T. N., Gonzalez, C., & Woolley, A. W. (2023). Fostering Collective Intelligence in Human–AI Collaboration: Laying the Groundwork for COHUMAN. *Topics in Cognitive Science*. <https://doi.org/10.1111/tops.12679>

Gupta, S., Tyagi, K., & Upadhyay, R. (2018). Twilight of voice, dawn of data: The future of telecommunications in India. *Decision*, 45(2), 161–183. <https://doi.org/10.1007/s40622-018-0181-0>

Hajkowicz, S., Sanderson, C., Karimi, S., Bratanova, A., & Naughtin, C. (2023). Artificial intelligence adoption in the physical sciences, natural sciences, life sciences, social sciences and the arts and humanities: A bibliometric analysis of research publications from 1960-2021. *Technology in Society*, 74. <https://doi.org/10.1016/j.techsoc.2023.102260>

Hamal, O., El Faddouli, N. E., Alaoui Harouni, M. H., & Lu, J. (2022). Artificial Intelligent in Education. *Sustainability (Switzerland)*, 14(5). <https://doi.org/10.3390/su14052862>

Huang, H. L., & Zhong, S. B. (2023). Application of Marxist-based science and technology theory in the ethical review of artificial intelligence robots. *SOFT COMPUTING*. <https://doi.org/10.1007/s00500-023-08663-2>

Huang, H., & Zhong, S. (2023). Application of Marxist-based science and technology theory in the ethical review of artificial intelligence robots. *Soft Computing*. <https://doi.org/10.1007/s00500-023-08663-2>

Huang, Z. (2022). Introducing Neuro-Symbolic Artificial Intelligence to Humanities and Social Sciences: Why Is It Possible and What Can Be Done? *TEM Journal*, 11(4), 1863–1870. <https://doi.org/10.18421/TEM114-54>

Hussain, W., & Ayob, A. (2023). Trends in Digital Marketing Research: A Bibliometric Analysis. *INTERNATIONAL JOURNAL OF MARKETING COMMUNICATION AND NEW MEDIA*, 11(20), 142–165. <https://doi.org/10.54663/2182-9306.2023.v11.n20.142-165> WE - Emerging Sources Citation Index (ESCI)

Karinshak, E., & Jin, Y. (2023). AI-driven disinformation: a framework for organizational preparation and response. *Journal of Communication Management*. <https://doi.org/10.1108/JCOM-09-2022-0113>

- Kempt, H., & Nagel, S. K. (2023). Responsibility, second opinions and peer-disagreement: Ethical and epistemological challenges of using AI in clinical diagnostic contexts. *Journal of Medical Ethics*, 48(4), 222–229. <https://doi.org/10.1136/medethics-2021-107440>
- Kokotinis, G., Michalos, G., Arkouli, Z., & Makris, S. (2023). On the quantification of human-robot collaboration quality. *INTERNATIONAL JOURNAL OF COMPUTER INTEGRATED MANUFACTURING*. <https://doi.org/10.1080/0951192X.2023.2189304>
- Koplin, J. J. (2023). Dual-use implications of AI text generation. *Ethics and Information Technology*, 25(2). <https://doi.org/10.1007/s10676-023-09703-z>
- Kua, K. P. (2023). Better health through better housing-Current impact and future prospects of randomized trials. *CONTEMPORARY CLINICAL TRIALS*, 127. <https://doi.org/10.1016/j.cct.2023.107114>
- Leong, L. Y., Hew, T. S., Ooi, K. B., Hajli, N., & Tan, G. W. H. (2023). Revisiting the social commerce paradigm: the social commerce (SC) framework and a research agenda. *INTERNET RESEARCH*. <https://doi.org/10.1108/INTR-08-2022-0657>
- Leshkevich, T., & Motozhanets, A. (2022). Social Perception of Artificial Intelligence and Digitization of Cultural Heritage: Russian Context. *Applied Sciences (Switzerland)*, 12(5). <https://doi.org/10.3390/app12052712>
- Liao, H. T., Lo, T. M., & Pan, C. L. (2023). Knowledge Mapping Analysis of Intelligent Ports: Research Facing Global Value Chain Challenges. *SYSTEMS*, 11(2). <https://doi.org/10.3390/systems11020088> WE - Social Science Citation Index (SSCI)
- Liu, M. S. M., & Lim, J. M. H. (2023). Establishing a research territory in economics: Implications for academic writing instruction. *SOUTHERN AFRICAN LINGUISTICS AND APPLIED LANGUAGE STUDIES*. <https://doi.org/10.2989/16073614.2022.2136224>
- Ma, B. (2023). The Impact of Environmental Pollution on Residents' Income Caused by the Imbalance of Regional Economic Development Based on Artificial Intelligence. *Sustainability (Switzerland)*, 15(1). <https://doi.org/10.3390/su15010637>
- Marquez, R., Barrios, N., Vera, R. E., Mendez, M. E., Tolosa, L., Zambrano, F., & Li, Y. (2023a). A perspective on the synergistic potential of artificial intelligence and product-based learning strategies in biobased materials education. *Education for Chemical Engineers*, 44, 164–180. <https://doi.org/10.1016/j.ece.2023.05.005>
- Marquez, R., Barrios, N., Vera, R. E., Mendez, M. E., Tolosa, L., Zambrano, F., & Li, Y. L. (2023b). A perspective on the synergistic potential of artificial intelligence and product-based learning strategies in biobased materials education. *EDUCATION FOR CHEMICAL ENGINEERS*, 44, 164–180. <https://doi.org/10.1016/j.ece.2023.05.005> WE - Science Citation Index Expanded (SCI-EXPANDED)
- Miao, H., Guo, X., & Yuan, F. (2021). Research on Identification of Potential Directions of Artificial Intelligence Industry From the Perspective of Weak Signal. *IEEE Transactions on Engineering Management*. <https://doi.org/10.1109/TEM.2021.3123639>
- Miyazaki, M., Ishikawa, K. I., Nakashima, K., Shimizu, H., Takahashi, T., & Takahashi, N. (2023). Application of the symbolic regression program AI-Feynman to psychology. *Frontiers in Artificial Intelligence*, 6. <https://doi.org/10.3389/frai.2023.1039438>
- Page, S. J., & Duignan, M. (2023). Progress in Tourism Management: Is urban tourism a paradoxical research domain? Progress since 2011 and prospects for the future. *TOURISM MANAGEMENT*, 98. <https://doi.org/10.1016/j.tourman.2023.104737>

- Perez, J., Castro, M., & Lopez, G. (2023). Serious Games and AI: Challenges and Opportunities for Computational Social Science. *IEEE Access*, 11, 62051–62061. <https://doi.org/10.1109/ACCESS.2023.3286695>
- Petit, L. (2023). Humanities and social sciences (HSS) and the challenges posed by AI: a French point of view. *AI and Society*. <https://doi.org/10.1007/s00146-023-01746-6>
- Possati, L. M. (2020). Algorithmic unconscious: why psychoanalysis helps in understanding AI. *Palgrave Communications*, 6(1). <https://doi.org/10.1057/s41599-020-0445-0>
- Robila, M., & Robila, S. A. (2020). Applications of Artificial Intelligence Methodologies to Behavioral and Social Sciences. *Journal of Child and Family Studies*, 29(10), 2954–2966. <https://doi.org/10.1007/s10826-019-01689-x>
- Roy, S., Al Musawi, A. F., & Ghosh, P. (2023). Inferring links in directed complex networks through feed forward loop motifs. *HUMANITIES & SOCIAL SCIENCES COMMUNICATIONS*, 10(1). <https://doi.org/10.1057/s41599-023-01863-z> WE - Social Science Citation Index (SSCI) WE - Arts & Humanities Citation Index (A&HCI)
- Scendoni, R., Tomassini, L., Cingolani, M., Perali, A., Pilati, S., & Fedeli, P. (2023). Artificial Intelligence in Evaluation of Permanent Impairment: New Operational Frontiers. *HEALTHCARE*, 11(14). <https://doi.org/10.3390/healthcare11141979> WE - Science Citation Index Expanded (SCI-EXPANDED) WE - Social Science Citation Index (SSCI)
- Schäffer, B., & Lieder, F. R. (2023). Distributed interpretation—teaching reconstructive methods in the social sciences supported by artificial intelligence. *Journal of Research on Technology in Education*, 55(1), 111–124. <https://doi.org/10.1080/15391523.2022.2148786>
- Shahid, W., Jamshidi, B., Hakak, S., Isah, H., Khan, W. Z., Khan, M. K., & Choo, K. K. R. (2022). Detecting and Mitigating the Dissemination of Fake News: Challenges and Future Research Opportunities. *IEEE Transactions on Computational Social Systems*. <https://doi.org/10.1109/TCSS.2022.3177359>
- Shapiro, M., Renly, S., Maiorano, A., Young, J., Medina, E., Neinstein, A., & Odisho, A. Y. (2023). Digital Health at Enterprise Scale: Evaluation Framework for Selecting Patient-Facing Software in a Digital-First Health System. *JMIR FORMATIVE RESEARCH*, 7. <https://doi.org/10.2196/43009> WE - Emerging Sources Citation Index (ESCI)
- Sinclair, D., Dowdeswell, T., & Goltz, N. (2022). Artificially intelligent sex bots and female slavery: social science and Jewish legal and ethical perspectives. *Information and Communications Technology Law*. <https://doi.org/10.1080/13600834.2022.2154050>
- Srivastava, S., Agrahari, S., & Singh, A. K. (2023). Spam community detection & influence minimization using NRIM algorithm. *COMPUTERS IN HUMAN BEHAVIOR*, 147. <https://doi.org/10.1016/j.chb.2023.107832>
- Swidler, A. (2023). Life's Work: History, Biography, and Ideas. *ANNUAL REVIEW OF SOCIOLOGY*, 49, 21–37. <https://doi.org/10.1146/annurev-soc-031021-040416> WE - Social Science Citation Index (SSCI)
- Tena-Meza, S., Suzara, M., & Alvero, A. (2022). Coding with Purpose: Learning AI in Rural California. *ACM Transactions on Computing Education*, 22(3). <https://doi.org/10.1145/3513137>
- Tigard, D. W., Braun, M., Breuer, S., Ritt, K., Fiske, A., McLennan, S., & Buyx, A. (2023). Toward best practices in embedded ethics: Suggestions for interdisciplinary technology development. *Robotics and Autonomous Systems*, 167. <https://doi.org/10.1016/j.robot.2023.104467>

- Tunca, S., Sezen, B., & Wilk, V. (2023). An exploratory content and sentiment analysis of the guardian metaverse articles using leximancer and natural language processing. *JOURNAL OF BIG DATA*, 10(1). <https://doi.org/10.1186/s40537-023-00773-w> WE - Science Citation Index Expanded (SCI-EXPANDED)
- Vogel, K. M. (2021). Big Data, AI, Platforms, and the Future of the U.S. Intelligence Workforce: A Research Agenda. *IEEE Technology and Society Magazine*, 40(3), 84–92. <https://doi.org/10.1109/MTS.2021.3104384>
- Wang, F. Y., Ding, W., Wang, X., Garibaldi, J., Teng, S., Imre, R., & Olaverri-Monreal, C. (2022). The DAO to DeSci: AI for Free, Fair, and Responsibility Sensitive Sciences. *IEEE Intelligent Systems*, 37(2), 16–22. <https://doi.org/10.1109/MIS.2022.3167070>
- Wang, G., Badal, A., Jia, X., Maltz, J. S., Mueller, K., Myers, K. J., Niu, C., Vannier, M., Yan, P., Yu, Z., & Zeng, R. (2022). Development of metaverse for intelligent healthcare. *Nature Machine Intelligence*, 4(11), 922–929. <https://doi.org/10.1038/s42256-022-00549-6>
- Wang, W., Ning, H., Shi, F., Dhelim, S., Zhang, W., & Chen, L. (2022). A Survey of Hybrid Human-Artificial Intelligence for Social Computing. *IEEE Transactions on Human-Machine Systems*, 52(3), 468–480. <https://doi.org/10.1109/THMS.2021.3131683>
- Yuan, C. L., Wang, S. M., & Liu, Y. (2023). AI service impacts on brand image and customer equity: empirical evidence from China. *JOURNAL OF BRAND MANAGEMENT*, 30(1), 61–76. <https://doi.org/10.1057/s41262-022-00292-8>
- Zajko, M. (2021). Conservative AI and social inequality: conceptualizing alternatives to bias through social theory. *AI and Society*, 36(3), 1047–1056. <https://doi.org/10.1007/s00146-021-01153-9>
- Zenni, R. D., & Andrew, N. R. (2023). Artificial Intelligence text generators for overcoming language barriers in ecological research communication. *AUSTRAL ECOLOGY*. <https://doi.org/10.1111/aec.13417>