Check for updates

ARTIFICIAL INTELLIGENCE IN ACADEMIC RESEARCH

Angélica Pigola[1]

Isabel Cristina Scafuto[2]

Priscila Rezende da Costa[3]

Vania Maria Jorge Nassif [4]

Introduction

Artificial intelligence (AI) has established itself as a transformative force in the digital era, influencing not only companies but also the field of academic research. This technological evolution, together with the exponential growth of data, is reshaping organizations, societies, and economies (George, Osinga, Lavie, & Scott, 2016). However, the application of AI in academic research is still in its early stages, and many academic journals are beginning to address its judicious use.

Historically, the word "contribution" has been the focus of academic reviews (Leidner, 2020). However, with the growing relevance of AI, editorials are now turning their attention to how this technology is being incorporated into research projects. The use of AI in scientific research promises to accelerate discoveries, optimize processes, and broaden the horizons of knowledge. However, there is a tendency to view AI in academic research in a limited way, often restricting it to the use of specific tools such as ChatGPT, even though AI has been an integral part of research for years, manifesting itself in various research techniques. Regarding the definition and scope of AI, we understand it as a discipline that applies advanced analytics

[1] Graduate Program in Administration at Nove de Julho University - Uninove
[2] Graduate Program in Project Management at Nove de Julho University - Uninove
[3] Graduate Program in Administration and Graduate Program in Project Management at Nove de Julho University - Uninove
[4] Graduate Program in Administration at Nove de Julho University - Uninove

Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023, Sept./Dec.). Artificial Intelligence in academic research

Section: Editorial Comment

and logic-based techniques, encompassing machine learning, deep learning, regression analysis, and more, with the goal of identifying and predicting patterns, making decisions, interpreting events, and automating actions (Gartner, 2023).

AI, with its ability to automate, predict, and discern patterns in large volumes of data, has the potential to revolutionize key areas of management, such as decision making and problem solving (Iansiti & Lakhani, 2020; Bailey, Faraj, Hinds, Leonardi, & von Krogh, 2022). Furthermore, AI offers a wide range of methodological opportunities to management researchers, allowing them to explore and analyze large data sets in innovative ways (Krakowski, Luger, & Raisch, 2022; Tang et al., 2022; Choudhury, Allen & Endres, 2020).

In this editorial, we seek to clarify and expand the understanding of AI by highlighting its relevance and potential in the academic field, as well as the considerations necessary for its effective application. AI is not just a tool but also a potential revolution in the field of research (von Krogh, Quinetta Roberson, & Marc Gruber, 2023).

Using AI in research

Despite the growing attention given to AI in the context of innovation (Mariani et al., 2023), there are few articles that use AI to support their research on this topic. The article by Mariani et al. (2023) highlights the use of AI in academic innovation research; however, it is evident that the adoption of AI as a research tool in itself is still in its infancy. This discrepancy between the study of AI and its practical use in academic research suggests the need for greater integration of AI into innovative research methods, taking advantage of its potential to accelerate discoveries and optimize processes.

Writing an article is, to a large extent, a creative effort that mixes theoretical, methodological, compositional, phenomenological, and framing aspects. Artificial intelligence (AI) has the potential to be integrated into all these different aspects in a variety of ways, playing a crucial role in innovation research.

From a theoretical point of view, today, there are a vast number of digital platforms that use useful AI techniques to discover publications, books, proceedings, and editorial comments in any area of research (George, Osinga, Lavie & Scott, 2016). These technologies offer summaries, indicate trends on any subject and analyze data, supporting researchers in defining the best theory for their projects, compiling information in an organized way and synthesizing content (Musib et al., 2017). This transformative role of AI highlights its potential to accelerate

discoveries and optimize processes in innovation research, reinforcing the need for greater integration of AI into research methods. AI has been shown to be a valuable resource for data analysis and literature reviews, such as Systematic Literature Reviews (SLR) (Burger et al., 2023). Additionally, von Krogh, Roberson, and Gruber (2023) outline how AI can facilitate the identification and use of new research opportunities, particularly in management.

In methodological challenges, the most common AI techniques are supervised learning, unsupervised learning, and deep learning. For example, in supervised learning, regressions are popular algorithms used to model the relationship between variables (Bzdok, Altman, & Krzywinski, 2018). Additionally, there are techniques such as decision trees and random forests, which are classification algorithms based on the idea of recursive data partitioning. Cluster analysis, a type of unsupervised learning, involves grouping data into common topics based on similarity. Neural networks, inspired by the structure and function of the human brain, are deep learning algorithms that model complex relationships and are widely used for tasks such as image recognition, natural language processing and time series prediction (Hinton & Salakhutdinov, 2006). The recent emphasis on transformer models, a form of neural network architecture, has the potential to revolutionize areas such as entertainment, art, and advertising, as well as being integrated across various industries to optimize processes (Vaswani et al., 2017). Additionally, there are studies that apply AI in innovative ways to analyze data and interpret behaviors in the real world. One example is the work of Momtaz (2021), who used emotional AI to quantify CEOs' emotions from public photographs during initial coin offerings (ICOs) and explored how these emotions impact firm valuations. In another example, Miric, Jia, and Huang (2023) employed supervised learning to classify texts on a large scale, specifically to identify AI-related patents indicating their ability to classify and quantify unstructured textual data, providing insights into AI technological innovation.

When composing texts, grammar checkers and online language editors, employing AI techniques, are valuable resources for creating academic essays. They are designed to identify errors that other grammar checkers miss, such as subject–verb agreement issues, syntax issues, word choices, pronoun usage, articles, and spelling. Additionally, Alshater (2022) explored the role of AI, specifically ChatGPT, in improving academic performance, which may be an area of consideration for researchers. The advent of ChatGPT, a GPT-3.5-based application, has drawn much attention recently, showing how GPT-3 and similar models can be used to improve search (Dwivedi et al., 2023). Some studies even listed a GPT derivative as a coauthor,

International
Journal of
Innovation

Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023, Sept./Dec.). Artificial
Intelligence in academic research

Section: Editorial Comment

highlighting the growing recognition of AI in the academic field (e.g., Kung et al., 2022; Transformer and Zhavoronkov, 2022; Transformer et al., 2022).

Nevertheless, there is a growing interest among researchers in the use of simulators, avatars, and intelligent tutors in the creation and/or investigation of new social phenomena. AI has also been used as a general-purpose speech transcription model in qualitative research, such as the technology presented by Kung et al. (2022) in their study of ChatGPT's performance on the USMLE exam, indicating the potential for AI-assisted medical education. In a similar context, Datt et al. (2023) discuss the role of ChatGPT-4 for medical researchers, indicating the growing importance of AI in medical research. Furthermore, the technology is trained on a large diverse audio data set and is a multitasking model that can perform multilingual speech transcription as well as speech translation and language identification.

Additionally, ethical issues related to AI (Bostrom & Yudkowsky, 2018) are of paramount importance, as they address both the guarantee that such machines do not cause harm to humans and other morally relevant beings and the moral status of the machines themselves, indicating the need for moral consideration not only for humans but also for nonhumans in the context of AI.

The examples cited from other areas elucidate the potential for using AI in innovation research.

The challenges of using AI

The use of AI in academic research still needs more practical exercise to analyze ethical issues. Being transparent in what you do and being able to explain the decisions that AI solutions make requires technological knowledge and the ability to understand what has to be done to be equally explainable and transparent. According to some authors (Gartner, 2022), AI solutions must be implemented in such a way that the data used and operations are secure, which includes the protection of privacy, the use of technology suitable for the purpose and the ability to collect more data and have more technological features for future development. The responsibility for using AI in academic research lies in the hands of developers, researchers, and their leaders. However, as AI solutions begin to iterate on building new theories and research frameworks, they become a complex question to explore.

Within the scope of innovative research, the integration of advanced AI and natural language processing (NLP) tools has unleashed a new set of possibilities. The ChatGPT model,

4 de **9**

Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023, Sept./Dec.). Artificial Intelligence in academic research

Section: Editorial Comment

representative of AI state-of-the-art, illustrates the potential of these technologies to evolve research methodologies and results. ChatGPT's capabilities extend from analyzing large data sets to generating insightful reports, providing a robust platform for researchers to explore intricate innovation challenges in greater depth. As the innovation landscape continues to develop, tools such as ChatGPT can be crucial in promoting a data-driven approach, enriching the depth and breadth of research, and consequently expanding the frontiers of knowledge in the field (Alshater, 2022).

The inclusion of AI in academic research and publications has been a topic of relevance among international journals and large databases. AI has demonstrated potential in helping researchers deepen insights and collaborate effectively. For example, Elsevier has introduced an alpha version of Scopus AI, a tool that combines generative AI with trusted Scopus content and data to make it easier for researchers to quickly gain deeper insights and support collaboration and the societal impact of research (Elsevier (2023, August 1). However, the increasing use of AI raises significant ethical and practical questions.

One of the central concerns lies in assigning authorial credit to AI-generated content. Elsevier, for example, has determined that AI and AI-assisted tools cannot be credited as authors on published work, a policy that reflects concerns regarding responsibility and authorship in academic research (Elsevier, n.d.-a). Furthermore, the company warns about the risks of data leaks and privacy violations associated with the use of AI in academic writing, especially when researchers upload academic content to platforms such as ChatGPT that require an internet connection (Elsevier, n.d.-b).

In March 2023, Wiley, in collaboration with the editor engagement team, hosted a webinar on protecting journals from systematic manipulation of the publishing process, with a special focus on artificial intelligence-generated content (AIGC). The discussion covered the implications of tools such as ChatGPT and how to detect and evaluate their use in submitted manuscripts and published articles. Wiley's policy, published in its authorship section in the best practices guidelines on research integrity and publication ethics, emphasizes that such tools cannot be listed as authors, and if they are used in research, their use must be disclosed in a transparent manner (Streeter, 2023).

Although there is no direct statement from Web of Science on the use of AI in academic research and publishing, bibliometric studies using Web of Science data have examined AI publication patterns, indicating a recognition of the multidisciplinary development of AI technology (Hajkowicz et al., 2023).

International
Journal of
Innovation

Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023, Sept./Dec.). Artificial
Intelligence in academic research

Section: Editorial Comment

Nevertheless, the adoption of AI is revealed in different stages in the literature, such as problem exploration, problem selection, solution exploration and solution selection (Mariani et al., 2023). Some authors (Garbuio & Lin, 2021; Kakatkar et al., 2020) have shown that AI can support these different steps based on problem solving and paradigm discovery, as it addresses cognitive impediments in generating innovative ideas. Although most empirical studies conducted thus far have focused on the adoption of AI in the solution selection phase for organizational problems (Mariani & Nambisan, 2021), more initiatives are certainly needed to deepen AI in academic research by supporting the initial stages of generation of ideas, thus facilitating the exploration of problems. Regarding the potential impact of AI on academic research, much discussion and knowledge needs to be provided to researchers to offer the powerful help that AI techniques can provide to the contribution and impact of academic-scientific research and thus demystify the unknown side of this discipline.

Final considerations

The integration of AI into academic research has shown significant potential to broaden methodologies and facilitate the exploration of large data sets, as exemplified by the use of ChatGPT. However, ethical and practical issues, especially in relation to the attribution of authorship, have been raised, as indicated by recommendations from international publishers and journals. For IJI, we suggest that mention of AI tools should be made in the method used to carry out the research and in a note as the context demands. Transparency and correct attribution of authorship emerge as fundamental aspects for the responsible incorporation of AI in academic research, thus ensuring integrity and effective contribution to the advancement of knowledge in the field. The IJI recognizes that AI, when combined with a rigorous methodological approach and appropriate ethical considerations, has the potential to significantly enrich academic innovation research.

References

Garbuio, M., & Lin, N. (2021). Innovative idea generation in problem finding: Abductive reasoning, cognitive impediments, and the promise of artificial intelligence. *Journal of Product Innovation Management*, *38*(6), 701–725. https://doi.org/10.1111/jpim.12602

Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023, Sept./Dec.). Artificial Intelligence in academic research

Section: Editorial Comment

Gartner. (2022). *AI Ethics: Use 5 Common Principles as Your Starting Point* (https://www.gartner.com/en/documents/3947359). Frank Buytendijk, Erick Brethenoux, and 2 more; pdf. https://www.gartner.com/en/documents/3947359

Gartner. (2023). *Applying AI — Techniques and Infrastructure* (https://www.gartner.com/en/documents/4300099). Chirag Dekate and Bern Elliot; pdf. https://www.gartner.com/en/documents/4300099

Kakatkar, C., Bilgram, V., & Füller, J. (2020). Innovation analytics: Leveraging artificial intelligence in the innovation process. *Business Horizons*, *63*(2), 171–181. https://doi.org/10.1016/j.bushor.2019.10.006

Leidner, D. E. (2020). What's in a Contribution? *Journal of the Association for Information Systems*, 238–245. https://doi.org/10.17705/1jais.00598

Mariani, M. M., Machado, I., & Nambisan, S. (2023). Types of innovation and artificial intelligence: A systematic quantitative literature review and research agenda. *Journal of Business Research*, *155*, 113364. https://doi.org/10.1016/j.jbusres.2022.113364

Mariani, M. M., & Nambisan, S. (2021). Innovation Analytics and Digital Innovation Experimentation: The Rise of Research-driven Online Review Platforms. *Technological Forecasting and Social Change*, *172*, 121009. https://doi.org/10.1016/j.techfore.2021.1210

Dwivedi, Y. K., Kshetri, N., Hughes, L., et al. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management, 71*, 102642.

Elsevier. (2023, August 1). Elsevier takes Scopus to the Next Level with Generative AI. Recuperado em 21 de outubro de 2023, de https://beta.elsevier.com/about/press-releases/elsevier-takes-scopus-to-the-next-level-with-generative-ai?trial=true

Elsevier. (s.d.-a). The use of AI and AI-assisted writing technologies in scientific writing: Frequently asked questions. Recuperado em 21 de outubro de 2023, de https://www.elsevier.com/about/policies/publishing-ethics/the-use-of-ai-and-ai-assisted-writing-technologies-in-scientific-writing

Elsevier. (s.d.-b). To Err is Not Human: The Dangers of AI-assisted Academic Writing. Recuperado de https://scientific-publishing.webshop.elsevier.com/research-process/the-dangers-of-ai-assisted-academic-writing/

Garbuio, M., & Lin, N. (2021). Innovative idea generation in problem finding: Abductive reasoning, cognitive impediments, and the promise of artificial intelligence. *Journal of Product Innovation Management*, *38*(6), 701–725. https://doi.org/10.1111/jpim.12602

Gartner. (2022). *AI Ethics: Use 5 Common Principles as Your Starting Point* (https://www.gartner.com/en/documents/3947359). Frank Buytendijk, Erick Brethenoux, and 2 more; pdf. https://www.gartner.com/en/documents/3947359

Pigola, A., Scafuto, I. C., Costa, P. R. C., & Nassif, V. M. J. (2023, Sept./Dec.). Artificial Intelligence in academic research

Section: Editorial Comment

Gartner. (2023). *Applying AI — Techniques and Infrastructure* (https://www.gartner.com/en/documents/4300099). Chirag Dekate and Bern Elliot; pdf. https://www.gartner.com/en/documents/4300099

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(C).

Hinton, G. E., & Salakhutdinov, R. R. (2006). Reducing the dimensionality of data with neural networks. *Science*, 313(5786), 504-507. https://doi.org/10.1126/science.1127647

Kakatkar, C., Bilgram, V., & Füller, J. (2020). Innovation analytics: Leveraging artificial intelligence in the innovation process. *Business Horizons*, *63*(2), 171–181. https://doi.org/10.1016/j.bushor.2019.10.006

Kung, T. H., Cheatham, M., Medenilla, A., Sillos, C., De Leon, L., Elepaño, C., ... (2023). Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models. *PLOS Digit Health, 2*(2), e0000198. https://doi.org/10.1371/journal.pdig.0000198

Leidner, D. E. (2020). What's in a Contribution? *Journal of the Association for Information Systems*, 238–245. https://doi.org/10.17705/1jais.00598

Mariani, M. M., Machado, I., & Nambisan, S. (2023). Types of innovation and artificial intelligence: A systematic quantitative literature review and research agenda. *Journal of Business Research*, *155*, 113364. https://doi.org/10.1016/j.jbusres.2022.113364

Mariani, M. M., & Nambisan, S. (2021). Innovation Analytics and Digital Innovation Experimentation: The Rise of Research-driven Online Review Platforms. *Technological Forecasting and Social Change*, *172*, 121009. https://doi.org/10.1016/j.techfore.2021.121009

Miric, M., Jia, N., & Huang, K. G. (2023). Using supervised machine learning for large-scale classification in management research: The case for identifying artificial intelligence patents. *Strategic Management Journal*, 44(2), 491–519. https://doi.org/10.1002/smj.3441

Momtaz, P. P. (2021). CEO emotions and firm valuation in initial coin offerings: An artificial emotional intelligence approach. *Strategic Management Journal, 42*, 558-578. DOI: 10.1002/smj.3235

Musib, M., Wang, F., Tarselli, M. A., Yoho, R., Yu, K-H., Medina Andrés, R., Greenwald, N. F., Pan, X., Lee, C-H., ... & Sharafeldin, I. M. (2017). Artificial intelligence in research. *Science*, 357(6346), 28-30. https://doi.org/10.1126/science.357.6346.28

Streeter, M. (2023, June 15). The implications of AI in academic publishing. Wiley. Recuperado em 21 de outubro de 2023, de https://www.wiley.com/en-

us/network/publishing/research-publishing/editors/the-implications-of-ai-in-academic-publishing

von Krogh, G., Roberson, Q., & Gruber, M. (2023) Recognizing and Utilizing Novel Research Opportunities with Artificial Intelligence. Academy of Management Journal, 66, 367–373, https://doi.org/10.5465/amj.2023.4002 https://doi.org/10.1177/01492063211040562