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Mapping the Nexus: A Bibliometric Analysis of the Application of Artificial Intelligence (AI) in Polycrisis Research (2019 – 2026)

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Abstract

This study aims to map the intellectual landscape of artificial intelligence (AI) applications in polycrisis research between 2019 and 2026 with the help of bibliometric techniques. Despite the growing use of the term polycrisis both in scholarly and popular discourse, the research area is fragmented. Polycrisis has recently emerged as a tool to describe the human dilemma, but no systematic mapping of the role played by AI in the framework of polycrisis has been undertaken. This study adopts a bibliometric approach guided by PRISMA 2020, using Biblioshiny in RStudio to analyse data sourced from the Web of Science Core Collection, limited to English articles published between 2019 and April 2026. The findings indicate that there is a rising tendency in the number of publications, especially following the global crises, which suggests that scholars are becoming increasingly interested in applying AI to complex global issues. It can further be seen that the research environment is fragmented with publication outlets scattered, collaboration patterns uneven, and limited integration of thematic areas. The policymakers are encouraged to foster interdisciplinary cooperation, responsible AI frameworks, and strengthen research alliances on the international level. This paper offers an extensive and synthesised bibliometric mapping unveiling the structural fragmentation, emergent themes, and dynamic developments of AI applications in polycrisis research.

1. Introduction

The twenty-first century momentum of global challenges and their growing complexity has prompted scholarship and policy circles to conceptualise the understanding, analysis, and alleviation of crisis in a new way. Conventional crisis models have tended to perceive shocks in the form of natural disasters, financial instabilities, and technological disruptions as individual and one-off occurrences. Nevertheless, recent scholarship emphasizes the fact that modern crises are often identified in interdependent groups, with the destabilisation of one area expanding vulnerabilities and risks in others (Liu & Renn, 2025). It is the interdependence that has led to the concept of polycrisis which can be explained as a condition of overlapping and interacting global disruptions that build upon each other and create systemic risk at an unprecedented scale (Liu & Renn, 2025; Delannoy et al., 2025). These crises are densely interrelated and thus require interdisciplinary research and analytical tools that are able to traverse the dynamic complexity, deep uncertainty, and cascading consequences.

At the same time, the concept of Artificial Intelligence (AI) has become a groundbreaking field in science and technology to transform the research, governance, and operational capabilities across industries. Its disruptive potential is between climate modeling and healthcare diagnostics, economic forecasting and disaster risk management (Tan et al., 2024; Lewis et al., 2024). The capability of AI to analyse extensive amounts of unstructured data and identify patterns that are not possible by humans makes it a promising solution in learning and responding to complex threats in the world. However, the development of AI is also involved in the intensification of world risk systems, such as the destruction of the environment, sociotechnical injustices, and economic inequalities (Bales, 2025; Delannoy et al., 2025). This two-sided nature as an instrument of resilience and as one of the possible sources of systemic risk demands strict scholarly consideration.

Although AI-related and topic-specific studies on AI have quickly grown, the intersectional scholarship in AI and polycrisis is still disjointed. Bibliometric studies have identified the role of AI in particular fields such as risk management (Bernardelli & Giudici, 2025), climate change (Barre et al., 2024), disaster and climate resilience and management studies in general (Sekaki et al., 2025) but few studies are systematic in analysing the contribution level of AI research towards polycrisis frameworks or addressing the structural deficiencies in the connection between these liter Additionally, the studies on polycrisis, as such, are still nascent and tend to be abstract and not empirical (Liu & Renn, 2025). According to the literature, crises, like climate change, economic susceptibility, and technological risks, are highly intertwined (Tan et al., 2024; Islam et al., 2022), yet there is no overall bibliometric map to elaborate on how AI research can overlap with these dimensions of polycrisis over time. This gap is consequential. The concept of polycrisis thinking has become widespread in global policy-making, particularly in sustainable development and global risks prediction, so the structural patterns, disciplinary influences, and thematic outlines of the contribution to polycrisis literature in AI innovations will assist in framing more integrative study agendas. As a typical instance, climate change as one of the fundamental destabilizing factors in polycrisis schemes is one of the areas where AI has been harnessed to improve predictive models, optimize mitigation efforts and refine adaptation processes (Barre et al., 2024; Lewis et al., 2024). But the literature also identifies constraints in access to data, unfair deployment, technological transparency and energy costs of AI systems that may harmfully contribute to vulnerabilities (Tan et al., 2024). Such tensions have highlighted the need to evaluate the quality of research both in terms of volume and conceptual range as well as in terms of methodological variety and thematic concentration as well as geographical dispersion.

To fill this research gap, it is necessary to use a bibliometric method that has the systematic mapping of the outlines of available literature, the knowledge cluster, and the underserved intersections between the domain of AI and polycrisis. The bibliometric approach has shown to be useful in the tracking of intellectual progression in interdisciplinary fields and the publication patterns, co-authorship ties, thematic groups, and high-impact publications (Islam et al., 2022; Sekaki et al., 2025). To indicate an example, bibliometric surveys have shed light on the development of the urban resilience research (Guo et al., 2022), climate governance scholarship (Li & Yaakop, 2025), and AI applications in the research of management (Sekaki et al., 2025). However, there is so far no systematic bibliometric review that synthesizes studies at the crossroad of AI and polycrisis theories in the context of key events in the world like climate change, systemic risks, and resilience.

This study is guided by three interrelated objectives. First, it seeks to analyse the publication trends in the application of AI within polycrisis research from 2019 to 2026, with particular emphasis on annual scientific production and average citations per year. Second, the research will perform a performance analysis that will determine the most influential sources, most mentioned countries, predominant affiliations, and the degree of international collaboration in terms of respective author contributions. Third, it attempts to understand the thematic organization of the field by analysing the most prevalent key words and conceptual trends using word cloud analysis, thematic mapping, and three field plots. Together, these goals give us a clear picture of the development, influence, and intellectual framework of research at the nexus of AI and polycrisis. Based on these objectives, the following research questions will be discussed in the study:

RQ1: What are the trends in the number of scientific publications and average citations per year of AI-driven polycrisis research from 2019-2026?

RQ2: Which are the most influential sources, countries, and institutions in the fields of AI and polycrisis research and how do trends of international cooperation influence the discipline?

RQ3: Which are the prevailing themes, keywords, and conceptual designs that define AI applications development in polycrisis studies?

This study makes a timely and original contribution by systematically mapping the emerging intersection between artificial intelligence and polycrisis research through a bibliometric lens. While existing literature has explored the conceptual foundations of polycrisis and the technical capabilities of AI independently, there remains a lack of integrative analyses that examine how these domains converge within the scientific landscape. This paper presents an overview of how the intellectual development and the research patterns in this dynamic discipline have advanced and developed by examining publication patterns and performance metrics and thematic patterns in the period between 2019 and 2026. Second, the research provides a clear and reproducible evidence base using the PRISMA 2020 framework and Biblioshiny, which reveal an overarching thematic cluster and new tendencies of 2019-2026. This enables researchers and policymakers to observe not only the quantity of work, but the conceptual transformation of AI as not a work tool but a key participant in crisis processes. Notably, the research goes beyond descriptive mapping to provide an idea of how AI is conceptualized in polycrisis discourse, whether as a solution, a risk factor, or a multifaceted and complex tool with an enabling and disruptive potential. By doing this, it is added to the current discussions on the ethical, social and environmental consequences of AI implementation during crises. Lastly, the findings are useful to guide researchers, policymakers, and practitioners by revealing knowledge gaps, actors and themes. This builds a better basis to conduct interdisciplinary research in the future and develop more responsible and informed uses of AI in solving complex global issues.

The rise of the concept of the polycrisis is an indicator of the more interconnected world in which several different crises interact, enhance each other, and give rise to a series of outcomes in the environmental, economic, social, and technological spaces. As an example, climate change is a factor in environmental degradation, which leads to socio-economic vulnerabilities, usually combined with technological failures and policy breakdowns to form complex systemic risks (Liu & Renn, 2025). Such overlapping and strengthening dynamics oppose the traditional methods of analysis that tend to view crises as isolated events. AI has become a promising tool in this regard because it can handle large volumes of data, discover patterns, and learn the complex systems (Tan et al., 2024; Lewis et al., 2024). Nevertheless, the place of AI is controversial. Some researchers note that it can contribute to better crisis prediction and response, but others warn that improperly controlled AI sources can support structural inequalities and cause environmental damages, which strengthen the very processes that are the foundations of polycrises (Bales, 2025; Delannoy et al., 2025). This tension makes it clear that an organized and evidence-based comprehension of the position of AI in polycrisis research is needed, which justifies the current bibliometric study.

2 Methodology

The study adopted a quantitative research approach, employing bibliometric analysis to examine the evolving nexus between AI and polycrisis research, as articulated in the study titled “Mapping the Nexus: A Bibliometric Analysis of the Application of AI in Polycrisis Research (2019–2026)”. The use of bibliometric techniques has become more prominent because of their ability to systematically analyse vast amounts of scientific data and assess performance of research. The presence of powerful analytical software, like R and VOSviewer, and elaborate academic databases, like Web of Science, Scopus, and Google Scholar, have enabled this development (Monson et al., 2025; Passas, 2024). Bibliometric analysis provides an opportunity to assess academic outputs systematically and identify trends in publications, intellectual frameworks, and thematic changes in a specific field. The timeline of the study (2019 - 2026) was chosen to include the wave of the interconnected global crises, starting with the COVID-19 pandemic and continuing with additional socio-economic, environmental, and geopolitical disruptions. This period will enable a narrow study of modern studies in the field of polycrisis dynamics and how AI can help in coping with these complexities. This study adheres to the PRISMA 2020 guidelines, which offers a systematic procedure of reporting systematic and bibliometric analyses, to guarantee transparency and methodological rigour, thereby boosting reproducibility and understanding (Nezameslami et al., 2025; Page et al., 2021). The methodology is organised into five key stages:

Stage 1: Research analytical tool

The bibliometric analysis was performed using the bibliometrix R-package. It is an open-source tool created in the R programming environment and is commonly known to be effective in extensive science mapping and statistical analysis (Aria & Cuccurullo, 2017). Its strengths lie in its extensive range of statistical techniques, seamless integration with data visualisation capabilities, and access to high-quality computational routines, enabling robust and reproducible scientific analysis. Bibliometrix has been effectively used in previous bibliometric and systematic review research that has proven its trustworthiness and analytical profundity (Kallon et al., 2026; Bach & Hoang, 2025; Mani et al., 2025; Monson et al., 2025).

Stage 2: Data source, selection and search strategy.

The bibliometric data were mainly obtained via Web of Science Core Collection, namely Science Citation Index Expanded (SCI-EXPANSED), Social Sciences Citation Index (SSCI), Conference Proceedings Citation Index - Science (CPCI-S) and Conference Proceedings Citation Index - Social Science and Humanities (CPCI-SSH). The electronic library of the Capital University of Economics and Business, Beijing, China was accessed, which is in line

with the practice in similar studies (Monson et al., 2025; Mani et al., 2025; Monson, 2024). A systematic search plan was created with a set of well-thought-out keywords concerning polycrisis and AI. The terms were combined in a systematic way using Boolean operators (AND, OR) according to the conventional methodological standards in existing studies (Atkinson & Cipriani, 2018; Monson, & Sackey, 2025). The main search terms were: polycrisis, multiple crises, systemic crises, interacting crises, compound crisis, complex crisis, artificial intelligence, machine learning, deep learning, expert systems, neural networks, intelligent systems, and AI. This strategy provided a thorough but specific search of useful literature. The search query is provided in the Appendix 1 and brought about an original dataset of 28 records.

Stage 3: Data screening and eligibility criteria.

The retrieved records were carefully screened to ensure that they were in line with the objectives of the study. The inclusion criteria included peer-reviewed articles, review papers, and conference proceedings published in English within the periods 2019 and 2026, and directly related to the use of AI in polycrisis studies.

The exclusion criteria were non-English publication, publication after the stated time, type of documents, including editorials, books, early access articles, retracted publications, and other documents that were not relevant to the topic of research. These are the same criteria used in other similar bibliometric research (Kallon et al., 2026; Mani et al., 2025; Monson, & Sackey, 2025; Monson, 2024). After the screening, 25 publications were selected as a final dataset to be analysed in detail.

Stage 4: Data analysis and the presentation of results

The chosen bibliographic data were exported into plain text format and then imported into the bibliometrix package in R-Studio for analysis. This helped to retrieve descriptive statistics and build bibliometric networks. The review was based on performance analysis and science mapping. The indicators that were analysed in terms of performance included annual scientific output, top authors, journals, institutional output and country level research output. The co-authorship networks, the patterns of key word co-occurrence as well as the thematic structures of the field were examined using the methods of science mapping (Chandran & Chandran, 2026). Moreover, visualisations were created to show publication patterns, collaboration patterns, and evolution of themes. These visual outputs enhance the interpretability of the findings and provide deeper insights into the intellectual structure and development of research at the intersection of AI and polycrisis.

Stage 5: Bias Reporting in accordance with PRISMA Framework.

This bibliometric analysis discusses the possible sources of bias explicitly in line with PRISMA framework to improve transparency and reliability. Bibliometrix package of R-Studio also facilitated the automated processing of the data and hence minimised the risk of human error and subjectivity in the data extraction and analysis (Nezameslami et al., 2025). Regardless of these measures, there are still some limitations. The 2026 dataset is also not complete since the data was collected until April 2026; hence, the results concerning this year must be interpreted with caution. Second, the authors confined the study to the English-language literature that might disqualify the possibility of the other related studies that are published in other languages. Third, the restriction to the 2019–2026 period, while intentional, may omit earlier foundational studies. These limitations are recognised and further explained in the limitations section of the study. These considerations have been well defined, and the study is done in accordance with PRISMA reporting standards, making sure that any potential biases are clear and that the reader can evaluate the strength of the findings in a critical manner. Figure 1 provides a PRISMA flow diagram of the study selection and screening process, which gives an overview of the data extraction process as recommended by Haddaway et al. (2022).

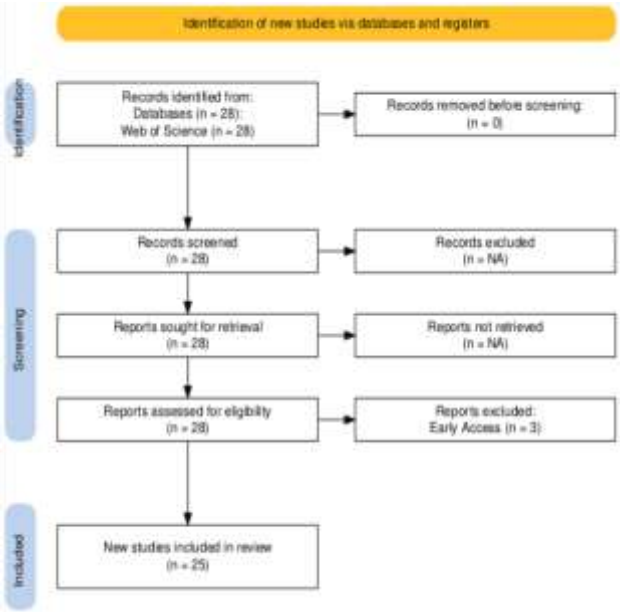

Figure 1: PRISMA flow diagramme for Bibliometric Analysis steps followed based on Haddaway et al. (2022).
Source: Author (2026)

3 Results

3.1 Publication trend

Annual scientific production

Figure 2 illustrates the annual scientific production on the application of AI application in polycrisis research between 2019 and 2026. The trend indicates a slow and uneven beginning, with the apparent and continuous rise in the number of research in the later years of the period. In the early

phase, academic contributions were limited and intermittent, reflecting the emerging nature of the intersection between AI and polycrisis research. However, from the period following the global disruptions associated with the COVID-19 pandemic, there is a noticeable upward trend in publications. This increase is consistent with the fact that recent events in the world, such as pandemics, climate-related disasters, geopolitical conflicts, and economic instability, have increased the interconnection of crises, hence the academic interest in the insight and resolution of such complexities (Rakowski et al., 2025). Moreover, this growing trend in the number of publications indicates the growing role of AI as a transformational instrument in various fields, which facilitates innovation, sustainability, and decision-making, as emphasised by Sekaki et al. (2025). The increase in research output in the later years indicates a gradual appreciation of AI as a tool in dealing with polycrisis dynamics. This downward trend in 2026 with is not a sign of decreased interest in the topic; it is a technicality of the data collection process since the search was concluded by April 2026. As a result, the 2026 number is a partial reflection of what is estimated to be a year of further growth as more studies come to the publication point. On the whole, the trend shows a fast-growing area that attracts more and more academic interest and is relevant to modern global issues.

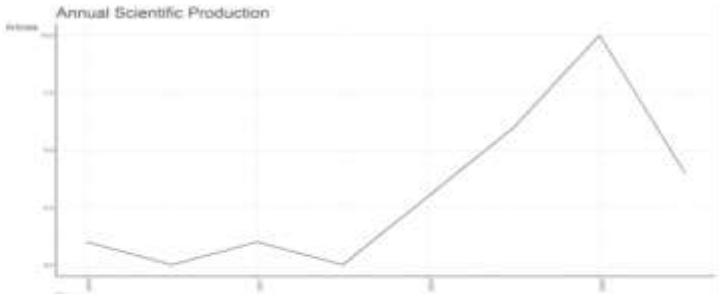

Figure 2 Annual scientific production
Source: Authors (2026)

Average citation per year

Figure 3 presents the average citations per year for studies examining the application of AI in polycrisis research from 2019 to 2026. This trend shows that within the initial years, citation impact was steadily growing, and then the peak occurred significantly in the middle of the timeframe, which indicates that the foundational studies at that period received considerable scholarly interest and impact. This increase in citation influence is indicative of the increased acceptance of AI as a useful tool in tackling complex and interconnected global issues, especially in its capacity to combine large volumes of data, enhance predictive ability, and facilitate informed decision-making in fields like climate research and crisis response (Tan et al., 2025). Moreover, the growing academic interest is in line with the overall changes that have seen AI emerge as a key source of innovation and sustainability in various fields, which has led to a rise in scholarly interest and citation levels (Sekaki et al., 2025). Following this peak, a decline in average citations is observed in the more recent years. This trend is natural in bibliometric research, where recently published articles will have fewer citations than older ones. Also, the observed decrease in citation impact in 2026 is to be treated with caution, since the data were only gathered till April of the same year and it does not reflect the entire citation potential. The greater number of citations in previous years might also be associated with the greater international concern with the interconnected crises, including the COVID-19 pandemic, climate-related processes, and geopolitical instability, which exacerbated the research interest and citation in the given field (Rakowski et al., 2025). Overall, the trend highlights a maturing research field where earlier contributions have established a strong intellectual foundation for ongoing studies

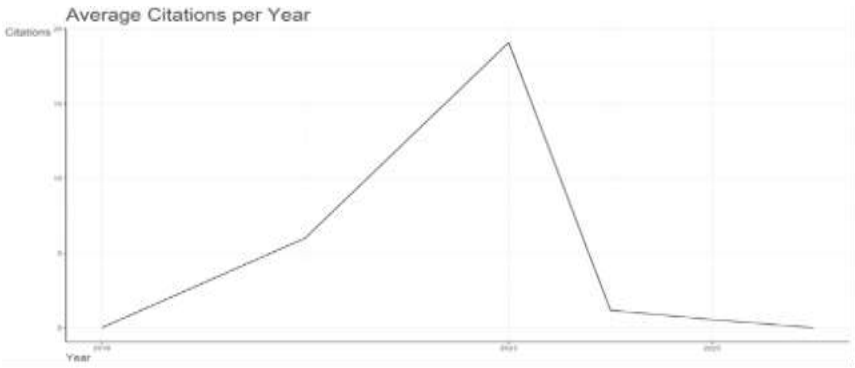

Figure 3 Average article citation per year
Source: Author (2026)

3.2 Performance analysis

Most relevant sources

Table 1 presents the ten most relevant sources publishing research on the application of AI in polycrisis studies between 2019 and 2026. The top source was Public Relations Review (n=2), followed by the 12th International Conference of Education, Research and Innovation (ICERI 2019) (n=1), the 2025 IEEE International Conference on Agentic AI (n=1), the African Studies Review (n=1), Applied Economics (n=1), Applied Intelligence (n=1), Applied Research in Quality of Life (n=1), the Asia Pacific Journal of Tourism Research (n=1), BMJ Open (n=1), and Environmental Research Letters (n=1). The very low publication rates of all sources, with the maximum of publications in one journal, shows that this field of research is still extremely fragmented and is not developed on the level of a mature scholarly investigation. This fragmentation is interesting to note since AI is generally described as the study of machines that mimic human behaviour in operations and activities and is an ongoing attempt to teach computers to learn, remember, think and act like humans (Balogun & Ayuba, 2024). Despite this broad relevance, the sparse distribution of articles suggests that researchers from different disciplines ranging from public relations and education to economics and environmental science are publishing in their own specialised outlets rather than converging around shared venues. The presence of Environmental Research Letters among the top sources aligns with evidence that AI is helping to improve predictions and support informed decision-making for climate research and action (Tan et al., 2025). Nevertheless, the general low

productivity of the sources can also be seen as a reflection of a field that is still working out how to incorporate AI into the field of polycrises in meaningful ways without neglecting the technical, ethical, and environmental issues that AI systems bring (Tan et al., 2025).

Table 1: Descriptive statistics: top 10–most relevant sources

Descriptive statistics: top 10–most relevant sources		
No	**Sources**	**Articles**
1	*Public Relations Review*	2
2	*12th International Conference of Education, Research and Innovation (ICERI 2019)*	1
3	*2025 IEEE International Conference on Agentic AI, ICA*	1
4	*African Studies Review*	1
5	*Applied Economics*	1
6	*Applied Intelligence*	1
7	*Applied Research in Quality of Life*	1
8	*Asia Pacific Journal of Tourism Research*	1
9	*BMJ Open*	1
10	*Environmental Research Letters*	1

Source: Author (2026)

Most cited countries

Table 2 gives the descriptive analysis of the top 10 most cited states in the sphere of AI and polycrisis study, showing the geographical distribution of the intellectual impact. Table 2 shows that the most mentioned country is Slovenia (n=207) and China (n=65), the United Kingdom (n=7), Bosnia (n=4), and Israel (n=4). Other contributing countries are Germany (n=3), Sweden (n=3), Romania (n=2), and the United States of America (n=2), and Canada (n=0) completes the list. The strong citation influence of European countries such as Slovenia and the UK is indicative of the academic attention to the polycrisis in that part of the world, notably with the EU experiencing a series of overlapping crises since the 2009 sovereign debt crisis, up to the 2022 invasion of Ukraine (Hoeffler et al., 2024). This geographical concentration of studies highlights the pressing need to train computational systems to learn and act human-like, to be better positioned to handle these disturbances (Balogun & Ayuba, 2024). Moreover, the worldwide attention as evidenced by the substantial number of citations provided by China implies that AI is actively being implemented to promote informed decision making and enhance predictions on climate action (Tan et al., 2025). Nevertheless, the different rates of citation also reflect the prevailing technical and ethical ambiguities that scientists have to operate within when using AI to such real-world emergencies (Tan et al., 2025).

Table 2: Descriptive statistics: top 10–most cited countries

Descriptive analysis: top 10–most cited countries			
No	Country	Total Citations	Average Article Citations
1	Slovenia	207	207.00
2	China	65	10.80
3	United Kingdom	7	3.50
4	Bosnia	4	4.00
5	Israel	4	2.00
6	Germany	3	1.50
7	Sweden	3	1.50
8	Romania	2	2.00
9	United States of America	2	1.00
10	Canada	0	0.00

Source: Author (2026)

Most relevant affiliations

Table 3 shows the descriptive statistics of the 10 most relevant institutional affiliations that contribute to the research nexus of Artificial Intelligence and polycrisis. Based on the data, the University of Ottawa (n=5) is the most relevant, then Dongbei University of Finance and Economics (n=3), and various other institutions provided two publications each, among them the American University of Beirut (n=2), the Royal Institute of Technology (n=2), the State University System of Florida (n=2), the University of Florida (n=2), and the University of Haifa (n=2). The African Development Bank Group, Bar Ilan University and Beihang University fill in the list with one article each (n=1).Such dissemination of institutional leadership implies an international scholarly interest in studying AI as a research of machines that are aimed at imitating human behaviour and control intricate operational tasks (Balogun & Ayuba, 2024). The active participation of high-profile financial and technological organizations is a sign that AI is used more and more to integrate large volumes of data and enhance forecasting, which is necessary to make informed decisions in the context of climate-related disturbances (Tan et al., 2025). This institutional diversity matters since although AI has the potential to make climate change research much more productive in terms of improved data, modelling, and scenario analysis, there are also considerable technical, ethical and environmental issues which can restrict the benefits (Tan et al., 2025). Thus, the contribution of various types of institutions such as universities, technical institutes, and development banks can diversify the field by providing complementary insights into the opportunities as well as the risks of AI implementation in polycrisis situations.

Table 3: Descriptive statistics: top 10–most relevant affiliations

Descriptive statistics: top 10–most relevant affiliations		
No	**Affiliation**	**Articles**
1	University of Ottawa	5
2	Dongbei University Of Finance And Economics	3
3	American University Of Beirut	2
4	Royal Institute of Technology	2
5	State University System Of Florida	2
6	University of Florida	2
7	University of Haifa	2
8	African Development Bank Group (AFDB)	1
9	Bar Ilan University	1
10	Beihang University	1

Source: Author (2026)

Most relevant countries based on corresponding author collaboration

Figure 4 presents the top countries contributing to research on the application of AI in polycrisis studies based on corresponding author collaboration. The distribution indicates that some dominant countries take up the research field with one country registering as the most productive with a number of others contributing moderately. One interesting trend in the figure is the existence of both single country publications and multiple country collaborations, which implies that some research is done on a national level, but there is also a significant amount of international collaboration. This trend shows how the polycrisis issues are worldwide and interlinked and sometimes demand cross-border sharing of knowledge. The high visibility of the dominant countries in this analysis is consistent with the results presented by Lewis et al. (2024), who note that major research powers, especially China and the United States, are at the center of promoting AI-related research and influencing future research trends. This leadership can be credited with better research infrastructure, funding ability and technological development. Moreover, the existence of international partnerships evidences the necessity of incorporating various data sets and viewpoints, which makes AI applications more efficient in dealing with challenging international problems. According to Tan et al. (2025), AI can play a vital role by integrating data, enhancing predictive potential, and offering informed decision-making, which is especially helpful in polycrisis situations. In general, this figure implies that, despite the focus of research on a small number of major countries, the global research network is gradually becoming stronger due to collaborative work on this new area.

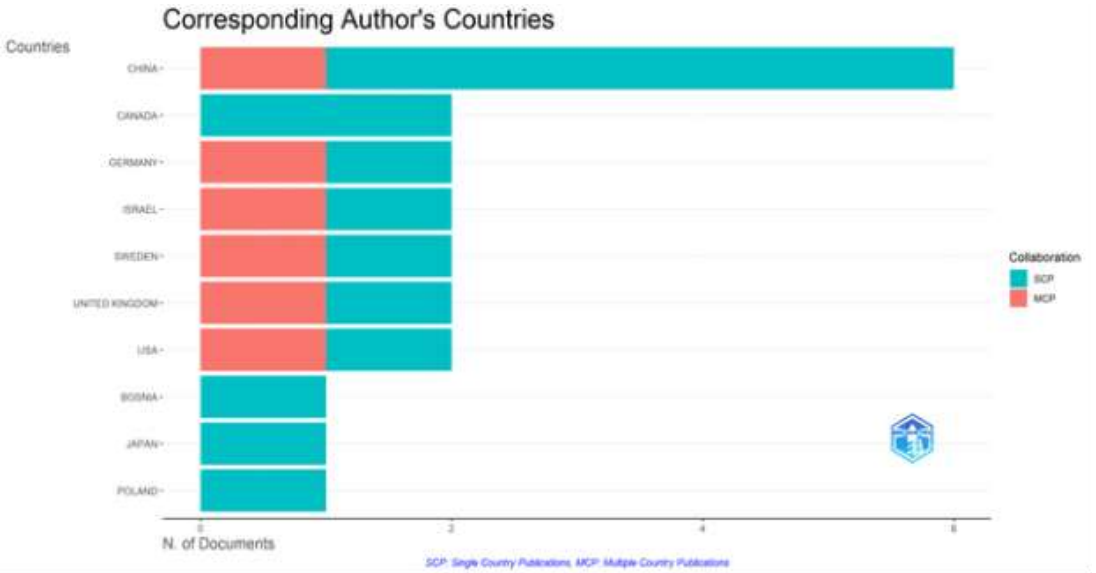

Figure 4: Top 10 - most relevant countries based on corresponding author collaboration
Source: Author (2026)

3.3 Thematic analysis

World cloud analysis showing the most dominant terms

Figure 5 is a visualisation of a word cloud of all the keywords retrieved in the bibliometric dataset, which gives a general picture of the prevalent and emerging themes in the literature on AI in polycrisis research within the period 2019 to 2026. The prevalence of such terms like artificial intelligence, deep learning, and communication emphasise the primary role that highly developed computational practices play in contemporary crisis response. This congruency implies that AI is being utilised to address systemic complexities through the combination of massive data sets and optimization of predictive models, thus making robust decision-making through the introduction of environmental and social turmoil (Tan et al., 2025). Moreover, the introduction of such keywords as crisis management, polycrisis, and anticipatory governance indicates a shift in academic opinion that the management of global risks is not only a scientific but also a political need (Charbonneau & Giguere, 2025). Nevertheless, the combination of words like the state of anxiety, identity, and depression with technological keywords reveal the human and ethical aspects of this nexus. Although AI enables the development of important innovations in the context of scenario analysis and resilience building, the literature also includes warnings about latent risks, such as the carbon footprint of AI infrastructure being high and the associated ethical issues with automated systems (Tan et al., 2025). This duality suggests that the trend in current research is shifting away from technical applications toward examining how AI can be used in a responsible manner. Ultimately, the word cloud demonstrates that effectively navigating the polycrisis requires a balanced approach that harmonises technological innovation with socio-political awareness and ethical safeguards.

Figure 5: showing word cloud analysis by all key words

Source: Author (2026)

Thematic Map

Figure 6 provides a four-quadrant thematic map, which categorizes the important research themes according to their relevance (centrality) and developmental maturity (density), which provides a strategic depiction of the intellectual territory of AI in polycrisis research between 2019 and 2026. The map shows that the theme of anxiety and identity exist together as niche themes, i.e. are developed but are still outskirts of the mainstream discourse. This clustering implies that there is a specialised literature that is interested in how the conditions of polycrisis, i.e. overlapping climatic, health, and economic shocks, determine individual and collective psychological reactions. Conversely, artificial intelligence is equally a niche term, which implies that AI-oriented studies are already highly developed, but have not yet become part of wider polycrisis systems. This relative isolation is remarkable since AI has already proven itself practically useful in merging various streams of data and enhancing the predictive accuracy of climate-related issues (Tan et al., 2025). The theme intelligence belongs to the emerging or declining quadrant, indicating the declining scholarly interest. The most likely reason is that the researchers have shifted to more targeted sub-disciplines such as deep learning or generative AI and the more general term of intelligence is less commonly used. Lastly, there is the lower-density, high centrality theme of communication. This observation suggests that communication is known as an underlining issue in the field, but not developed as a research domain. This underdevelopment is a problem as it is only through considering scientific and political uncertainties as equally significant that it is possible to govern polycrisis effectively (Charbonneau & Giguere, 2025). Combined, the thematic map shows a disjointed field in which the psychological, technical and communicative dimensions are yet to come together to form a mature, integrated research programme.

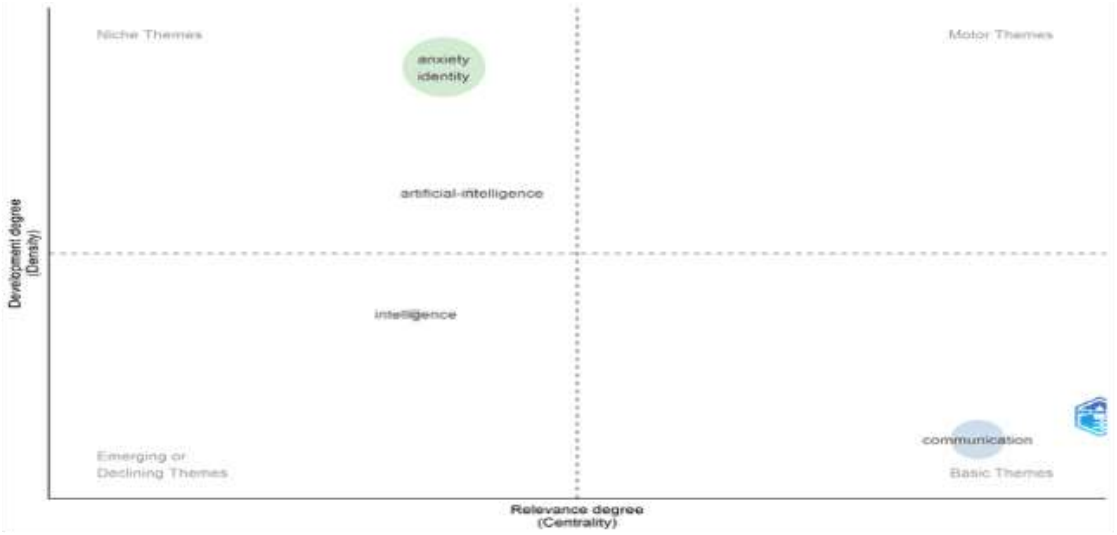

Figure 6: Thematic map:

Source: Author (2026)

Three-Field Plot

Figure 7 is a three-field plot (also referred to as a Sankey diagramme), a visualisation tool that represents flows or relationships between three separate groups of variables. In this research, the diagramme demonstrates connections between top journals (left field), author keywords (middle field), and associated universities (right field), thus showing how particular research subjects congregate in particular publication sources and institutional settings. A Sankey diagramme is especially helpful in this case since the thickness of every connecting flow reflects the strength of such association, enabling readers to swiftly recognise the prevalent paths in the literature. In the middle field, the keyword of anxiety is closely related to the words of depression and social value, and these relationships are directed more heavily towards the Public Relations Review and Applied Research in Quality of Life journals. This trend indicates that studies on psychological aspects of polycrisis have found their natural place in health and wellbeing publication sources. In its turn, the term metamodernism is associated with Public Relations Review, which implies a less, yet more specific body of knowledge on the subject of philosophical and communicative reactions to the intersecting crisis.

Furthermore, the Sankey diagramme shows that BMJ Open and Environmental research Letters are referent sources, with the strong connection to the keywords like artificial intelligence. This stream proves that AI is not only being positioned as a technical tool, but as a process of enabling informed decision-making and producing a positive social impact (Tan et al., 2025). The right field shows that the University of Ottawa, the University of Haifa, and Bar-Ilan University are major institutional players. Remarkably, the Royal Institute of Technology is seen to be related to fewer keyword groups, which possibly indicates a more technical-oriented approach. This pattern in institutions is important in the sense that the use of AI in tackling polycrisis issues involves the ability to harmonise technical and ethical understanding with environmental concerns of AI systems, but the technical, ethical, and environmental hazards of AI systems are still a major issue of concern (Tan et al., 2025). Moreover, the lack of robust linkages between technical AI descriptors and policy-oriented journals points to an existing gap. The problem with this gap is that a competent response to polycrisis requires the simultaneous approach to it as a scientific and a political phenomenon (Charbonneau & Giguère, 2025). In general, the Sankey diagramme shows that the intellectual landscape is quite disjointed, with psychological, technical, and policy discussions still emerging relatively independently of each other.

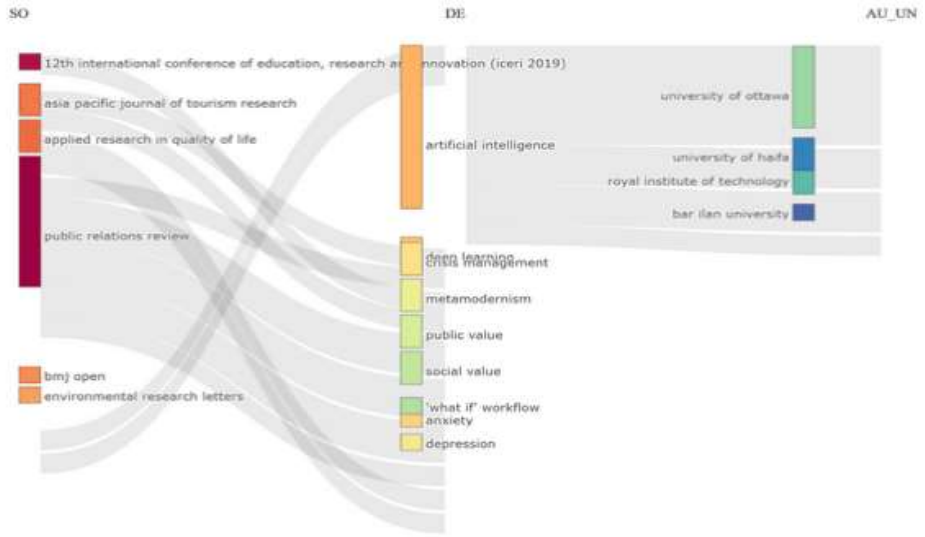

Figure 7: Three- field plot: Source:

Author (2026)

3.4 Discussion

The findings of this study reveal a rapidly emerging yet still fragmented research field at the intersection of AI and polycrisis. The publication trends analysis demonstrates a gradual but steady increase of scholarly output followed by a steep rise in scholarly output, especially in the years following the disruptions experienced by the globe during the COVID-19 pandemic. This implies that external shocks have been the drivers of academic interest, as they have compelled researchers to examine AI as a crisis management tool in an interconnected crisis. The citation analysis also shows that previous research has been more influential, which is based on the nature of the initial contributions, and the recent publications have not yet amassed similar effects because of citation lag. The analysis of the performance shows the existence of a fragmented publication environment, with less dominant journals, meaning that the research was distributed across various fields for the period examined. This divergence is indicative of the interdisciplinary character of polycrisis studies, which cuts across various disciplines including both environmental science and economics, as well as public health and communication. Also, the geographical distribution of citations and contributions proves the fact that the influence is concentrated in several areas, especially in Europe and some parts of Asia, but at the same time, the global involvement is increasing. This trend is supported by institutional analysis which sees various organisations who play a role in various fields such as universities, research institutes and development organisations. The thematic analysis also highlights the complexity of the field. Although technical AI-related terms like deep learning dominate, human-centred topics like anxiety and identity are also evident. This implies that the discourse is changing to be more than technical problem-solving and more to be social and ethical. In general, the results indicate the field that is growing fast yet conceptually and institutionally fragmented.

The findings can be discussed in terms of three key themes, such as the change in the focus of research, the organisation of networks, and the disintegration of theoretical progress. First, evolution of research focus reflects a shift between the exploratory and conceptual discussions towards more applied and interdisciplinary approaches. At a glance, research seems to have been preoccupied with learning what AI can do in a complex context, yet, with time, we can see a distinct shift towards making AI a part of the real-life answers to global crises. This move also implies that the subject is slowly shifting towards more application than conceptualisation, though this is not evenly distributed across disciplines. Second, collaboration patterns reveal a partially connected global research network. Although certain countries are leading the output and influence, the fact that both single country and multi country publications do occur, suggests that the cooperation between countries is growing but is not fully integrated yet. This has significant implications, since the problems of polycrisis are global in nature and need to be addressed in a coordinated effort. The lack of collaboration can limit the sharing of different viewpoints and the efficiency of AI-based applications in solving complicated problems on the global level. Third, the results reveal the presence of a high level of theoretical fragmentation. The fact that publications are spread out in a number of journals and the theme of both technical and psychological and policy aspects are separated implies that the field does not have a single conceptual framework. This fragmentation can be a barrier to the cumulative knowledge development and capacity to produce holistic solutions. As a result, although AI has a great potential to resolve the issues of polycrisis, the absence of an interdisciplinary approach can diminish its overall effectiveness. To solve these problems, more intensive interdisciplinary cooperation and the creation of common theoretical bases will be necessary.

The findings of this study broadly support existing literature on AI and complex global challenges. As an example, the dual role identified in AI as a facilitator and a threat is consistent with the ideas of Delannoy et al. (2025), who state that AI can alleviate and solidify systemic crises based on the manner in which it is integrated within the institutional framework. In the same vein, the growing research output and attention to the topic observed in this work are comparable to Lewis et al. (2024), who outlined the growing significance of AI in dealing with climate-related issues and the prevalence of dominant countries and affiliations. The thematic diversification observed in this analysis also confirms the results of Barre et al. (2024) and Sekaki et al. (2025), who both stated that the focus of AI usage is no longer on technical applications, but on a wider range of issues, including sustainability, decision-making, and social impact. Moreover, the growing interest in vulnerability and a growing number of crises are compatible with Islam et al. (2022), who highlighted the growing academic interest in climate-related vulnerabilities and their socio-economic consequences. Furthermore, the observed concentration of knowledge production and emerging thematic areas aligns with Li and Yaakop (2025), who found that research fields related to global governance and climate change were characterised by both centralised influence and thematic diversification. Lastly, the identification of systemic risks of AI suggests the anxieties of Bales (2025), who mentioned the possibility of interacting harms as the cause of the greater polycrisis dynamics. Taken together, these similarities indicate that the current research has a strong foundation in the already existing literature.

Despite these similarities, this study also reveals several important deviations from prior research. Compared to Barre et al. (2024) and Sekaki et al. (2025) that define a relatively organized thematic groupings and more coherent disciplinary convergence, the current analysis reveals a greater level of

fragmentation, especially in the adoption of AI into polycrisis models. This indicates that AI application to polycrisis is less mature and fragmented, whereas other areas of AI research are becoming increasingly cohesive. Unlike Lewis et al. (2024), who underline the pre-eminence of particular nations, like China and the United States, this work recognises a more varied set of citation impact, with smaller or less predictable nations also playing a prominent role. This implies that the study of polycrisis could be influenced by local experience of interconnected crises, resulting in an expansion of influence on a wider geographical area. Moreover, where Delannoy et al. (2025) and Bales (2025) concentrate more on conceptual and theoretical risks linked to AI, this study offers empirical data of how these tensions are displayed in the academic environment, specifically in the form of disjointed themes and insufficient connection. Similarly, although Islam et al. (2022) and Li and Yaakop (2025) identify clearer thematic evolution, the present study finds that key themes such as communication and psychological impacts remain underdeveloped.

4 Conclusions and Recommendations

4.1 Conclusions

This study provides a comprehensive bibliometric mapping of the application of artificial intelligence in polycrisis research, offering new insights into how this emerging field is evolving. The analysis demonstrates that while research output has increased significantly in recent years, the field remains fragmented across disciplines, institutions, and thematic areas. This fragmentation echoes the complexity of polycrisis as such, which cuts across the environmental, economic, social, and technological sectors. One of the primary contributions of this research is the fact that it combines several aspects of analysis, namely, publication trends, performance indicators, and thematic structures, into one coherent framework. In this way, it goes beyond mere descriptive analysis and provides a more in-depth insight into the way knowledge is being created, disseminated, and conceptualised in this discipline. The bibliometric analysis highlights that AI is increasingly recognised as a valuable tool for addressing complex global challenges, yet its application remains uneven and lacks a unified direction. Notably, the results indicate that the discipline is undergoing a period of discovery to a more practical and interdisciplinary approach. Nevertheless, this shift is limited by a lack of collaboration and integration of technical, social, and policy-based research. This has left the potential of AI in solving polycrisis challenges untapped. Overall, this study contributes to the literature by identifying key gaps, emerging trends, and structural weaknesses within the field. It offers a basis on future studies and presents feasible considerations to policymakers and practitioners who may want to use AI to overcome complicated international issues. The mapping of the nexus on AI and polycrisis contributes to the current state of knowledge on the ways in which technological innovation can be oriented towards the overall needs of society.

4.2 Implications for policy

To begin with, policymakers need to invest in the creation of interdisciplinary platforms that bring together AI researchers and practitioners in crisis management. The observation that technical AI studies are not strongly related to policy-oriented journals suggests that there is a communication gap that weakens evidence-based policymaking. The particular action steps include the formation of cross-sector working groups in which cross-sector information sharing between computer science departments and civil protection agencies must occur regularly. Funding agencies should require collaborative dissemination plans that translate AI research findings into policy briefs and operational guidelines, not just academic publications.

Secondly, governments should prioritise the development of ethical AI governance systems that are tailor-made to polycrisis situations. The niche themes presented in the thematic map of the search of the word anxiety and identity show that psychological and social aspects of AI implementation are neglected in the general research. Policymakers can respond by commissioning regulatory impact assessments, which assess the impacts of AI systems on mental health and social cohesion in policies during overlapping crises. They include specific requirements such as the reporting of algorithmic transparency and the establishment of independent control organizations with psychological competence.

Thirdly, the global funding agencies ought to encourage research partnerships among high impact countries such as Slovenia and new players to increase geographical involvement. The over-representation of the citation impact in a small number of countries makes intellectual fragility and restricts the range of crisis situations that are reflected in the literature. There are actionable recommendations such as the development of specific research grants, which need to involve South-North collaboration and the encouragement of open-access publication models that minimise the impediments to researchers in underrepresented areas. Also, organisers of conferences need to actively enlist speakers representing countries with developing research profiles.

Finally, the policymakers need to consider closing the gap between technical innovation and social needs. The results indicate that the themes of communication and human well-being are not developed yet are significant. Governments have to invest in programmes that entail incorporation of social sciences in AI research to make sure that technological solutions are effective and socially acceptable. Moreover, it will be crucial to establish effective communication approaches that can assist in transforming AI insights into actionable policies. This would enhance public trust and see to it that AI-driven decisions are transparent and inclusive.

4.3 Limitations of the study

To begin with, that this research is constrained by its use of Web of Science Core Collection database, i.e. the Science Citation Index Expanded, Social Sciences Citation Index, and Conference Proceedings Citation Index. While these databases are highly reputable, they may not capture all relevant publications, particularly those indexed in other databases such as Scopus or Google Scholar. Secondly, the dataset covers only the publications until April 2026, and thus, the data of 2026 are not complete. These bias impacts both the number of publications and citation analysis, with recent research having less time to gather citations, which may underestimate their influence. Thirdly, the study focuses exclusively on English-language publications. This can create a bias in the language used, whereby other studies that are published in other languages may be excluded and especially in areas where polycrisis problems are so prevalent. Fourthly, a bibliometric analysis is quantitative in nature and does not necessarily reflect the qualitative nature of each study. This can lead to the fact that the analysis does not fully capture important contextual insights and theoretical nuances.

4.4 Future research direction

First, the next generation of research should involve empirical studies that go beyond the bibliometric mapping to explore the substantive content and quality of AI applications in polycrisis situations. Bibliometric analysis can show trends of publication and citation, but it is not possible to state whether

AI tools are effective in real crisis management situations. The researchers are encourage to construct case studies, simulations, and field experiments that can test particular AI interventions, e.g., predictive models of compound disaster events or natural language processing systems of crisis communication under realistic polycrisis conditions. Secondly, future studies should expand data collection to include multiple databases beyond Web of Science, such as Scopus, PubMed, IEEE Xplore, and the ACM Digital Library, to capture a more comprehensive corpus of AI-polycrisis research. The coverage of each database has its own advantages: Scopus has more regional and social science journals, PubMed has health-related AI applications that were related to the pandemic polycrisis dimensions, and IEEE Xplore has technical computer science literature that might be underrepresented in Web of Science. Also, researchers are encouraged to include preprint archives such as arXiv and medRxiv to capture newly created research before its publication, thus reducing the citation lag bias. Third, the gaps that were revealed in the present analysis should be specifically addressed in future research, especially the underdeveloped links between the technical AI research and policy-oriented publication media. Sankey diagramme indicated that psychological themes converge to journals on health whereas technical key word does not have policy connections. Researchers are encouraged to examine what obstacles exist in ensuring that AI technical research is able to reach policy audiences, are they disciplinary publishing conventions, differences in language and framing, or a lack of incentive structures in policy engagement. Moreover, the niche positioning of the themes of anxiety and identity implies the possibility of conducting a more detailed qualitative study of the psychosocial effects of AI-mediated crisis management. Finally, to overcome the language and geographical bias of English-only database searches, future studies should carry out comparative bibliometric analyses of several languages. Translation tools and multilingual search methods would help researchers find non-English publications on AI and polycrisis and compare the patterns of themes and citation effects in linguistic communities. Also, since the author surprisingly found that Slovenia is the largest citation impact with the United States having the lowest influence, future research must employ interview-based or documentary research to comprehend the concrete institutional, funding, or intellectual conditions that allowed Slovenia to have an outsized impact. This qualitative follow-up would be the how and why behind the quantitative patterns identified by this study.

Appendix 1: Search string

(("polycrisis" OR "multiple crises" OR "systemic crises" OR "interacting crises" OR "compound crisis" OR "complex crisis") AND ("artificial intelligence" OR "machine learning" OR "deep learning" OR "expert systems" OR "neural network*" OR "intelligent systems" OR "AI"))

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Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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