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Mapping Tools, Techniques, and Applications for Research Excellence: A Bibliometric Study

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ABSTRACT

The quality of research has become a crucial measure of quality, impactful and innovative scientific results in the contemporary knowledge-based age. This paper gives an in-depth examination of research tools, techniques, applications, and solutions that help in the realization of research excellence. The systematic literature review and bibliometric methodology were used, however, with the help of the Dimensions.ai database, where 705 relevant articles were identified after inclusion and exclusion criteria were followed. The research analyzes quantitative, qualitative, mixed-method, and bibliometric methods, as well as sophisticated digital applications and AI-related methodologies. The results show that the volume of research and citations has increased especially since 2020, which is evidence of the growing importance of data analytics, cross-disciplinary teamwork, and open science practices. Moreover, the paper determines the major challenges, such as the dependency on the metric, resource constraints, and complexity of the methods. This paper suggests a merged system of tools, methodologies and ethical practices that can improve the quality of research, its visibility and impact on society and provides good knowledge to researchers, institutions, and policymakers.

1. Introduction

Research is an organized and methodical process of producing new knowledge, testing existing theories, and addressing complicated real-life issues as a result of scientific inquiry. It is the basis of science, engineering, medical and social development. The amount of worldwide research output has grown exponentially in the modern knowledge-based economy with millions of scholarly publications every year. Nonetheless, this has brought serious questions with respect to the quality, reliability, and effect of research thus highlighting the importance of research excellence.

Research excellence is not the simple measure of the number of publications but concerns the rigor, originality, reproducibility, and relevance of research to the society. Good quality research

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enhances evidence based decision making, leads to technological innovation, and fosters sustainable development. On the other hand, poor research procedures may result in unreliable results, insufficient applicability, and resource wastage. Consequently, research excellence has become one of the core concerns of researchers, institutions, and funding agencies globally [1].

Various measures and systems have been created to determine the quality of research. Historically, the evaluation systems were based on the high number of citations, the impact factors of the journals, and h-index values. These measures, however, have been more and more criticized as being too narrow in terms of capturing the larger impact of research. The recent academic discussion underscores the changing definitions and evaluation models of research excellence in the international academic circles. Programs like the Declaration on Research Assessment (DORA) and the Leiden Manifesto have criticized traditional evaluation practices and proposed more responsible and inclusive evaluation practices [2].

Research excellence as a concept can be viewed as a compromise between the strengths and the challenges inherent in it as depicted in Figure 1. It on the one hand leads to innovation and advancement of knowledge, high-impact publications, interdisciplinary cooperation, and financial and resource attraction which will ultimately result in a great impact on society and industry. Conversely, the quest to achieve excellence is usually coupled with issues like publication pressure, too much emphasis on quantity rather than quality of research, bias and ethical issues in research, unavailability and inequality in funding. This two-sided viewpoint underlines the fact that, as much as it is true that research excellence is a pre-requisite to progress, it should be ventured upon a balanced and ethical platform to make any sustainable and meaningful contribution to the science and society.

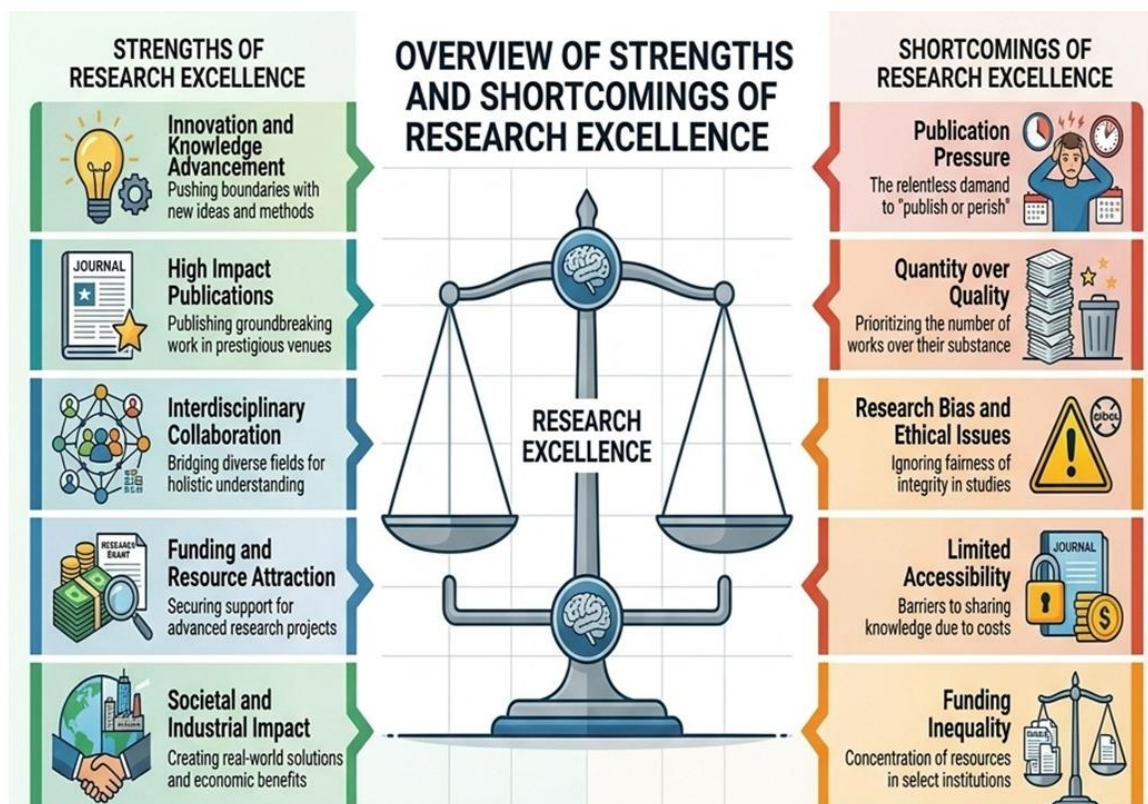


Fig. 1. Conceptual illustration of strengths and challenges in research excellence

In recent systems, such as the United Kingdom Research Excellence Framework (REF) and the Canadian Institutes of Health Research (CIHR), the systems have moved to multidimensional

assessment frameworks that introduce societal impact, research environment, interdisciplinary and inclusiveness. Moreover, on the global level, discussions, including the 2023 workshop of the European Commission on research assessment, focus on the idea that research excellence should be flexible enough to accommodate national and cultural specifics.

Although these have been developed, there is still a major gap in the research in merging tools, techniques, applications and practical solutions into a whole system of attaining research excellence. Although literature tends to focus on these elements separately, little can be found that offers the holistic view of the interconnection of methodological rigor and technological progress. The appropriate use of modern research tools, including data analytics software, bibliometric visualization tools, and artificial intelligence, together with the right research methods, is a key to improving the quality and impact of the research.

This study is important because it fills this gap by providing a detailed discussion of research tools, techniques, applications, and solutions that enhance research excellence. The study will offer some practical information that can be used by the researchers, academicians, and professionals to enhance the efficiency, accuracy, and innovation in research. Research excellence has wide applications, including academic research, industrial innovation, and healthcare developments, and evidence-based policy making in the social sciences.

The paper is divided into fourteen sections in order to cover research excellence in detail. It starts with literature review and methodology then by bibliometric analysis. Further parts of the paper detail research instruments, methods, and assessment models. Also, data analytics and visualization, interdisciplinary research, and ethical practices are discussed. The paper also draws attention to applications, research gaps and discussion. Lastly, it gives solutions, challenges, limitations, future research directions and finally gives key insights to promote excellence in research.

2. Literature Review

A literature review is a critical analysis of existing literature about a given topic to establish key findings, gaps and trends. It integrates the information of various sources, which offers a basis to the new study. It allows setting the context, justifying the purpose, and directing approaches to achieving research excellence by reviewing past research. The literature review shows that recent research is devoted to the combination of AI, bibliometric analysis, and interdisciplinary approaches to the research to improve the quality and novelty of the research. Although the data analysis, visualization, and decision-making have been greatly improved, there are still limitations to data, methodological gaps, and lack of standardization, which means that further research and development is possible as Table 1 demonstrates.

2.1 Research Gap & Novelty of the Study

The available research on research excellence is mostly divided, with a particular emphasis on tools (AI, bibliometric), assessment (REF, DORA), interdisciplinary practices, or ethical standards. The absence of a unified framework of tools, techniques, applications, and ethical considerations is a gap that needs to be addressed. Moreover, there is a lack of literature on how AI-driven systems can be used to improve the overall end-to-end research processes and maintain transparency, interdisciplinary, and societal impact.

The study offers a holistic and integrated approach to research excellence by incorporating various aspects of research excellence, such as AI tools, evaluation models, interdisciplinary methods, data analytics, and ethical practices. It suggests a holistic approach that relates these dimensions into one ecosystem and provides practical implications to researchers, institutions, and policymakers. The

research is also useful in the next-generation research setting, as it emphasizes the new role of AI-aided decision-making and real-time evaluation metrics.

Table 1
 Summary of Literature Review

Author(s) & Year	Description	Findings	Limitations
Pinar & Horne [3]	Study evaluating the effectiveness of the Research Excellence Framework (REF) using correlation and principal component analysis	REF components (environment, impact, output) are highly correlated; removing one element causes minimal change in funding allocation and rankings; suggests simplifying evaluation	High evaluation cost; potential bias in peer review; limited consideration of alternative evaluation models
Thelwall <i>et al.</i> [4]	Study exploring machine learning models to evaluate research quality using REF2021 data and bibliometric inputs	ML models (Random Forest, XGBoost) achieved higher accuracy in medical, physical sciences, and economics; limited success in social sciences and humanities; accuracy improved with active learning	Lower accuracy across diverse disciplines; reduced prediction coverage with higher accuracy methods; dependency on large bibliometric datasets
Grzeszczyk [5]	Study applying Support Vector Machines (SVM) to evaluate scientific excellence of research proposals in higher education	SVM reduces subjectivity in peer review; effective in handling large and diverse datasets; improves objectivity in funding decisions	Requires large datasets; model complexity; still needs validation across different domains and real-world scenarios
Sørensen <i>et al.</i> [6]	Study analyzing the evolution of the EU's concept of research excellence and the development of a composite indicator	Shift from qualitative (peer review-based) to quantitative (indicator-based) definition of excellence; focus on breakthrough-oriented research and policy control	Over-reliance on quantitative indicators; may overlook qualitative aspects of research and researcher contributions
Wigren-Kristoferson <i>et al.</i> [7]	Study on academic work, commercialization, and knowledge dissemination in Sweden using survey and interviews	Identified a virtuous cycle between research excellence and knowledge diffusion (commercialization & public engagement); high-performing researchers actively engage in both	Context limited to Sweden; results may not generalize globally; reliance on self-reported data
Bonaccorsi <i>et al.</i> [8]	Study analyzing research excellence across universities using bibliometric indicators across Europe, North America, and Asia	European universities lag behind the USA in objective excellence (top publications and citations); competitive only in limited fields; highlights "transatlantic gap"	Reliance on bibliometric indicators; may overlook qualitative aspects of research; limited consideration of institutional and policy differences
Pinar & Unlu [9]	Study analyzing the UK Research Excellence Framework (REF) focusing on impact weighting and funding distribution	Increased importance of impact (25%) influences funding allocation; larger institutions with higher research income achieve better impact scores; funding gap between institutions widens	Potential bias toward well-funded institutions; risk of "gaming strategies"; limited focus on smaller or emerging institutions
Torrance [10]	Study examining the UK Research Excellence Framework (REF) from a governance and neoliberal perspective, especially in education	REF reflects neoliberal influence in academia; significantly impacts institutional practices; creates both intended and unintended consequences in research management	Focused mainly on UK context; qualitative interpretation may limit generalizability; lacks quantitative validation
Antes [11]	Study based on interviews with 52 researchers focusing on leadership, integrity, and team management practices	Identified key practices: meetings, mentorship, shared ownership, and positive team culture; leadership and relationship-building are crucial for research excellence	Small sample size; qualitative nature limits generalization; lack of structured leadership training frameworks

2.3 Research Questions

- i. What are the major research tools and technologies used today?
- ii. How do different research techniques affect research quality?
- iii. What role do bibliometric and evaluation frameworks play?
- iv. How can AI and digital tools enhance research excellence?

2.4 Objectives of the Paper

The main objective of this study is to provide a comprehensive analysis of the key elements shaping contemporary research practices. Specifically, it aims to examine the range of research tools, technologies, and techniques currently in use, while also evaluating the methodologies and frameworks that guide scholarly work. In addition, the study explores the growing role of bibliometric methods and AI-based approaches in research, highlighting their contributions and implications. Finally, it seeks to identify existing research gaps and limitations, offering insights that can support future advancements in the field.

3. Methodology

This research paper uses a systematic literature review and bibliometric analysis method to examine tools, techniques, applications, and solutions of research excellence. The chosen source of primary data is the Dimensions.ai database as it covers a wide range of peer-reviewed publications and metadata. The first search with the specified query returned 3,775 records without filters. The search query was built based on the applicable keywords and Boolean operators: (research excellence) and (tools) or (techniques) or (applications) or (solutions) and (bibliometric analysis) or (evaluation framework) or (data analytics) and (interdisciplinary research) or (research ethics) or (open science). This provided a thorough coverage of the research area as shown in Figure 2.

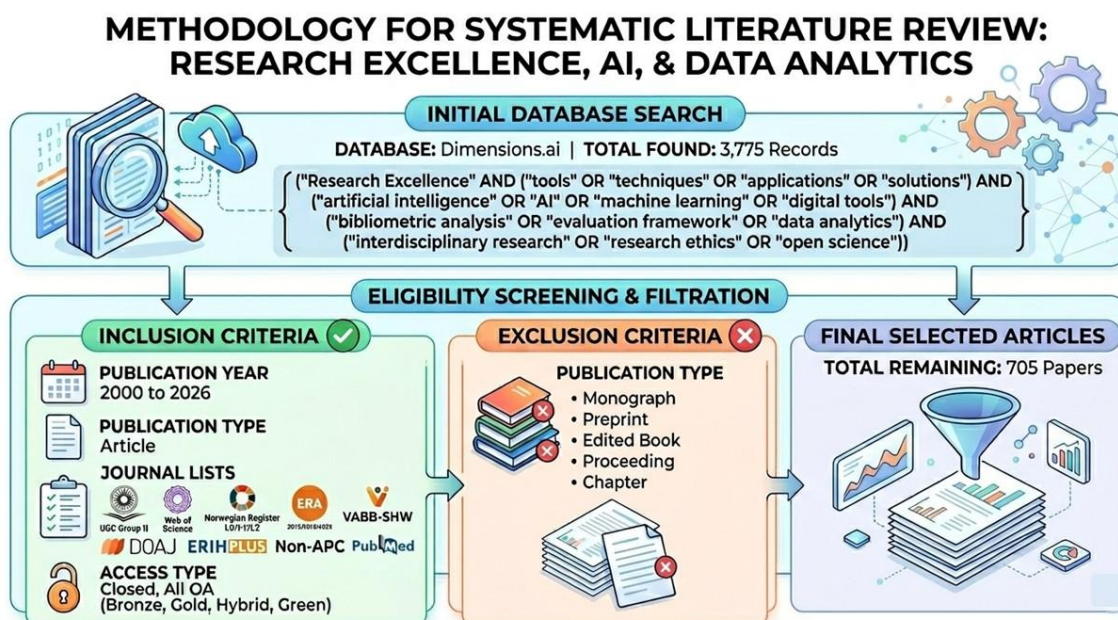


Fig. 2. Methodology Framework

Inclusion criteria were used to narrow down the dataset. The publications included only those published in 2000-2026 to include the foundational and recent developments. The research

considered journal articles included in selected databases like UGC Journal List Group II (for example, Web of Science), Norwegian Register (level 0, 1, and 2), ERA (2015, 2018, 2023), VABB-SHW, DOAJ, ERIH PLUS, Non-APC journals and PubMed. The access types (Closed, Open Access: Gold, Green, Hybrid, Bronze) were incorporated to make access as broad as possible. Non-research materials like monographs, preprints, edited books, and conference proceedings, and book chapters were removed as the exclusion criteria. When these filters were used, the dataset was narrowed down to 705 high-quality research articles.

Relevance and quality were maintained through a multi-stage screening procedure. Title screening was first carried out to eliminate irrelevant studies and then abstract screening was conducted to determine suitability in relation to the objectives of the research. Lastly, full-text review was made to make sure that the studies that directly dealt with research excellence and the tools and frameworks that accompany it were included. To analyse it, VOSviewer software was utilised to conduct bibliometric network analysis, such as co-authorship, co-citation, and mapping of leading author, sources, organisation and country. This methodology allowed determining the main trends in research, the authors who had a significant impact, and the thematic groups of study with the guarantee of a strong, clear, and reproducible methodology.

4. Bibliometric Analysis

4.1 Annual Publication, Citation and Field of Research Trends

The trend of publication years (2000 to April 2, 2026) is characterized by a slow developmental trend, which has little output in the first few years (2000 to 2013) and then a steady rise in the number of publications between 2014 and 2016. Another important increase starts after 2016, with a sharp increase since 2021 as indicated in Figure 3. The highest number of publications is in 2025 (210 papers) which points to a good research growth. The fact that the number of publications is already 60 in early 2026 indicates that the trend is going to persist thanks to progress in AI, digital tools, and interdisciplinary research practices.

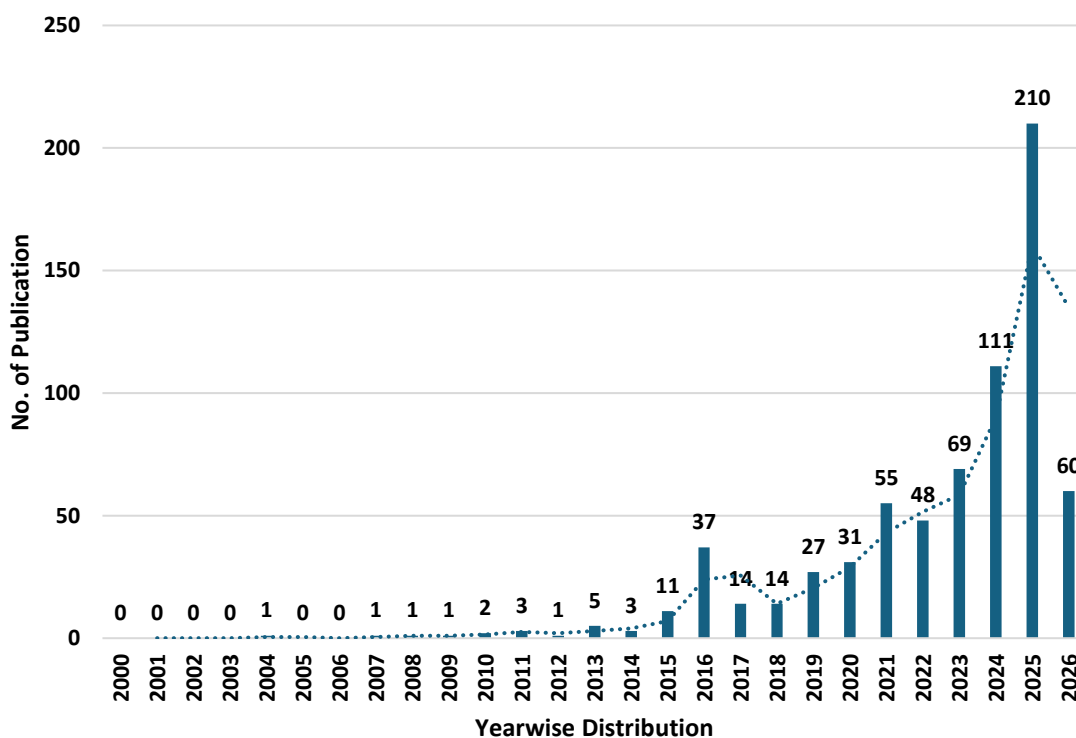


Fig. 3. Annual Publication Distribution

The trend of citation by year shows that there was low citation in 2000, and the citation increased gradually in 2013-2016. After 2017, the sharp growth of citations starts, as there were 184 citations in 2017 and 670 citations in 2020. This increase is expected to be accelerated starting in 2021 to a peak of 6505 citations in 2025 as illustrated in Figure 4. The current high impact can be observed by the 1928 citations already known in early 2026. This trend demonstrates growing recognition across the world due to innovation in AI, digital tools, and interdisciplinary research in meeting research excellence.

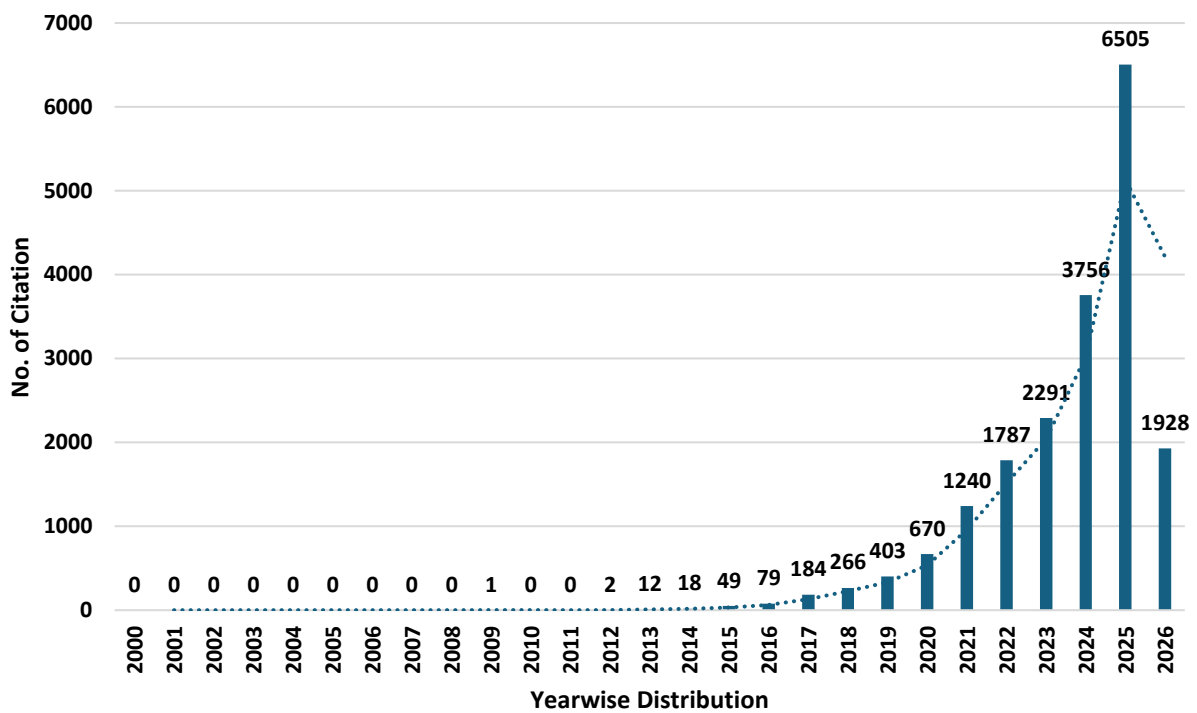


Fig. 4. Annual Citation Distribution

The scholarly distribution of the research in the field shows that the article is of a highly interdisciplinary nature, as it is called Comprehensive Insights into Tools, Techniques, Applications, and Solutions for Research Excellence. Information and Computing Sciences (216), Biomedical and Clinical Sciences (174), and Health Sciences (145) rank the highest in terms of their contributions and indicate the powerful impact of digital technologies and studies in the field of healthcare as indicated in Figure 5. Management, education and social sciences are moderately represented, whereas physical, mathematical, and creative areas are underrepresented. This distribution is a representation of the pre-eminence of technology-driven and applied research fields.

4.2 Most Productive Journals

High-quality Q1 journals are prevalent in the analysis of the most productive sources. Respiriology has the highest number of publications (30), whereas IEEE Access has a high citation effect (540). Such journals as Research Policy and Diabetologia are characterized by high impact factors which are indicative of influential contributions as it is observed in Table 2. High academic credibility is marked by the existence of well-known publishers like Elsevier, Wiley, and IEEE, Springer. All in all, the distribution is balanced in terms of productivity and impact with high-ranking journals playing a significant role in promoting the excellence of research.



Fig. 5. Field-wise distribution of research

Table 2

Most productive sources

Sl. No.	Sources	Publication	Citation	Quartile	Cite Score	Impact Factor	Publisher
1	Respirology	30	11	Q1	10.3	6.3	John Wiley & Sons
2	Scientometrics	13	151	Q1	7.6	4.1	Akademiai Kiado
3	IEEE Access	12	540	Q1	9.0	3.6	IEEE
4	Research Evaluation	11	71	Q1	5.7	2.5	Oxford University Press
5	Journal of Informetrics	9	81	Q1	7.0	3.5	Elsevier B.V.
6	Sustainability	7	176	Q1	7.7	3.3	MDPI
7	Research Policy	6	268	Q1	15.0	8.0	Elsevier B.V.
8	Drug and Alcohol Review	6	12	Q1	4.9	2.6	Wiley-Blackwell
9	JACC Advances	6	0	Q1	2.7	-	Elsevier B.V.
10	Diabetologia	5	92	Q1	16.7	10.2	Springer Science

4.3 Leading Authors

The review of the top 10 authors demonstrates massive contributions to this study. Dwivedi and Thelwall have the most publications with five each and Crick has the greatest impact of citation (327) which is a strong influence as illustrated in Figure 6. The performance of citation is also significant among authors like Bzdok and Gandomi. The existence of OECD brings institutional contributions. The data, in general, demonstrates the balance between productivity and impact, and leading

authors have a significant contribution to the development of knowledge in the sphere of research excellence and other similar areas.

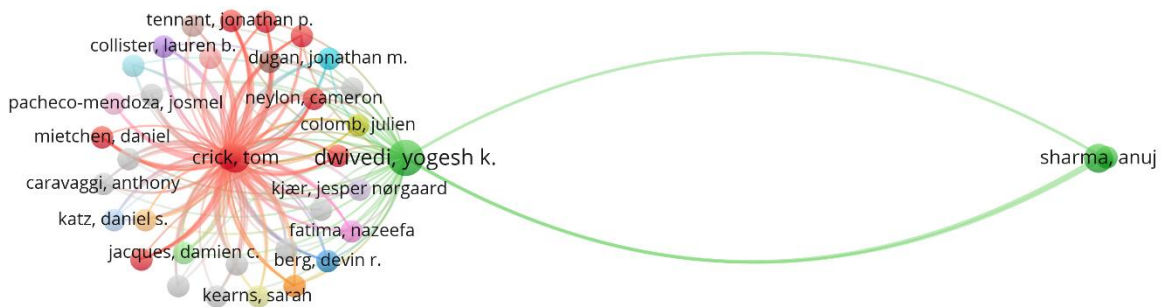


Fig. 6. Network Analysis of Leading Authors

4.4 Top Institutions

The study of the top 10 organizations in the analysis shows a good institutional contribution to this study. McGill University is the most productive (13 publications), whereas the University of Oxford has the highest citation impact (2095), which has a huge impact as indicated in Figure 7. The strength of citation in Imperial College London is also high (1078). University College London and University of Montreal are other institutions that make their contributions. All in all, the information indicates an international representation of major institutions with high-research output and high citation impact in promoting research excellence.

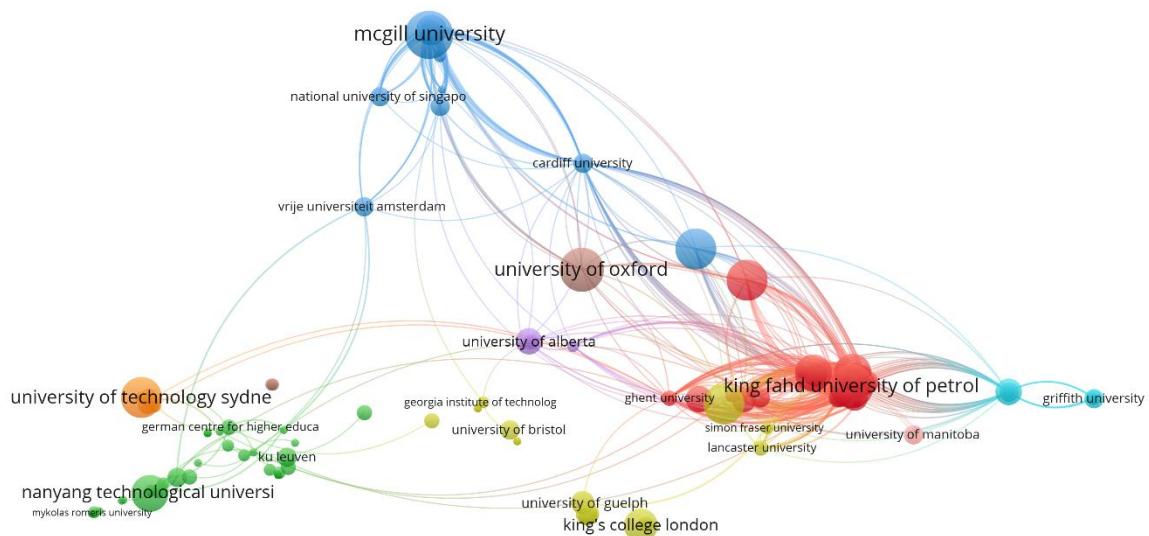


Fig. 7. Network Analysis of Top Institutions

4.5 Top Country-wise Research Contribution

The country-wise analysis indicates that the United Kingdom is the top-ranked in terms of research productivity (112 documents) and citation impact (6643) as it is illustrated in Figure 8, followed by the United States and Canada. The Netherlands has lower publications (30) which provides high citation impact (4221) and hence good quality of research. Germany is also influential with 1993 citations. New participants like India, China, Malaysia and Saudi Arabia indicate that more countries are getting involved in the world. In sum the distribution indicates that both developed and

These tools and techniques collectively provide the basis of doing a good, dependable and effective research.

Table 3
Research Tools and Software for Research Excellence

Category	Tool	Description	Application
Research Information Management Systems (RIMS) [12]	Symplectic Elements	Widely used CRIS system in universities	Captures and manages research outputs; supports REF assessments
	Pure (Elsevier)	Comprehensive research management system	Profile management, reporting, and performance evaluation
	Converis (Clarivate)	End-to-end research lifecycle management tool	Manages grants, publications, and research tracking
Impact Tracking & Altmetrics [13]	Altmetric Explorer	Tracks online research attention	Monitors mentions in news, policy, and social media
	Overton	Policy citation tracking platform	Identifies research impact on policy documents
	ImpactTracker	Impact evidence management tool	Supports case study development for impact assessment
Bibliometrics & Citation Analysis [14]	Web of Science	Multidisciplinary citation database	Tracks citation patterns and research evolution
	Scopus	Large peer-reviewed literature database	Citation tracking and analytics (h-index, FWCI)
	SciVal	Research performance analytics tool	Institutional benchmarking and performance evaluation
	Publish or Perish	Citation analysis software	Extracts and analyses citations from Google Scholar
Reference & Writing Management [15]	Zotero	Open-source reference manager	Manages references, PDFs, and citations
	Mendeley	Reference management and collaboration tool	Organizes research papers and generates bibliographies
	EndNote	Premium reference manager	Handles large-scale referencing and document libraries
Plagiarism Detection Tools [16]	iThenticate	Professional plagiarism detection tool	Ensures originality of manuscripts before journal submission
	Turnitin	Widely used academic plagiarism checker	Detects similarity in student and research documents
	Grammarly Plagiarism Checker	Writing and plagiarism tool	Checks originality along with grammar improvement
AI-Powered Discovery & Summary [17]	Scholarcy	AI-based summarization tool	Converts papers into structured summaries
	Research Rabbit	Visual research discovery platform	Maps relationships between papers and authors
	Scite	AI citation analysis tool	Shows supporting, contrasting, or mentioning citations

Table 4
 Quantitative Research Methods for Research Excellence

Method	Description	Key Features	Application in Research Excellence
Experimental Research [18,19]	Involves manipulation of an independent variable to observe its effect on a dependent variable while controlling other factors	Random assignment, control group, cause-effect relationship	Considered the gold standard for establishing causality and ensuring high internal validity
Quasi-Experimental Research [18,20]	Similar to experimental research but lacks random assignment	Uses pre-existing groups, real-world settings	Useful when randomization is not feasible; balances practicality and control
Descriptive / Survey Research [18,21]	Collects data using structured tools like questionnaires or surveys	Large sample size, standardized questions	Helps identify trends, patterns, and general behaviours across populations
Correlational Research [22]	Examines the relationship between two or more variables	Statistical correlation (positive/negative), no manipulation	Useful for prediction and identifying associations, but does not establish causation
Causal-Comparative (Ex Post Facto) [23]	Investigates causes after an effect has already occurred	No variable manipulation, retrospective analysis	Suitable for studying phenomena where experimentation is not ethical or possible
Longitudinal Studies [24]	Collects data from the same subjects over a long period	Time-based analysis, repeated observations	Best for analysing development, trends, and changes over time
Cross-Sectional Studies [25]	Collects data from different groups at a single point in time	Snapshot approach, multiple groups	Fast and cost-effective for comparing variables across populations

Table 5
 Qualitative Research Methods for Research Excellence

Method	Description	Key Features	Application in Research Excellence
Phenomenology [26]	Focuses on understanding the lived experiences of individuals regarding a specific phenomenon	Explores perceptions, emotions, and meanings; in-depth interviews	Helps uncover deep insights and universal experiences, useful in psychology, management, and healthcare research
Grounded Theory [27]	Develops a theory based on data collected rather than starting with a hypothesis	Iterative data collection and coding; theory building	Ideal for new or unexplored research areas, ensuring theory is grounded in real-world data
Ethnography [28,29]	Involves immersion in a particular culture or social group over time	Participant observation, field notes, cultural interpretation	Provides rich contextual understanding of behaviors, practices, and social interactions
Case Study Research [28,30]	In-depth analysis of a single case (individual, organization, or event)	Detailed, contextual, multi-source data	Best for studying complex real-life problems and generating practical insights
Narrative Inquiry [31]	Examines stories and personal accounts to understand experiences	Focus on storytelling, sequence, and meaning-making	Useful for understanding identity, decision-making, and human experiences
Content / Thematic Analysis [32]	Systematic coding and identification of patterns in qualitative data	Theme development, categorization, flexible approach	Helps organize large datasets and extract meaningful patterns and insights
Action Research [33]	Collaborative problem-solving approach involving researchers and participants	Iterative cycles (plan-act-observe-reflect)	Supports real-world problem solving and immediate application of research findings

Table 6
 Mixed-Method Research for Research Excellence

Category	Strategy	Process	Key Feature	Contribution to Research Excellence
Core Design	Explanatory Sequential (QUAN → QUAL) [34]	Quantitative data collected first, followed by qualitative analysis	Explains numerical results with human insights	Provides deep interpretation, improves understanding of results
Core Design	Exploratory Sequential (QUAL → QUAN) [35]	Qualitative exploration first, then quantitative validation	Builds tools from real-world observations	Enhances innovation and validity, useful in new research areas
Core Design	Convergent Parallel (QUAN + QUAL) [36]	Both data types collected and analysed simultaneously	Independent analysis with integration	Ensures triangulation, increases reliability and robustness
Advanced Strategy	Joint Display [37]	Combines quantitative and qualitative results in one table/figure	Visual integration of findings	Improves clarity and evidence strength
Advanced Strategy	Pragmatic Paradigm [38]	Focuses on practical solutions over theoretical debate	Problem-solving orientation	Enhances real-world applicability and flexibility
Advanced Strategy	Purposeful (Nested) Sampling [39]	Selects participants from a subset of initial data	Targeted and focused sampling	Improves accuracy and depth of insights
Quality Pillar	Rationale [40]	Justifies need for mixed-method approach	Explains limitation of single method	Strengthens research justification and credibility
Quality Pillar	Integration [41]	Defines when/how data is combined	Clear point of interface	Ensures methodological rigor and coherence
Quality Pillar	Meta-Inferences [42]	Derives insights from combined datasets	Higher-level interpretation	Produces novel and high-impact findings

Table 7
 Bibliometric Analysis for Research Excellence

Method	Description	Key Features	Application in Research Excellence
Performance Analysis [43]	Evaluates research productivity and impact of authors, institutions, or countries	Metrics such as citation count, h-index, impact factor	Helps measure research performance, ranking, and academic influence
Co-Citation Analysis [44]	Identifies relationships between papers frequently cited together	Focus on older foundational papers; intellectual structure mapping	Reveals the core theories and knowledge base of a research field
Bibliographic Coupling [45]	Links papers that cite the same references	Focus on recent publications; shared references	Identifies current research trends and emerging topics
Co-Word Analysis [46]	Analyses keywords that frequently appear together in publications	Keyword mapping, thematic clustering	Helps understand conceptual structure and topic evolution
Co-Authorship Analysis [47]	Examines collaboration networks among researchers or institutions	Network analysis, collaboration mapping	Identifies key contributors and global research partnerships
Citation Analysis [48]	Focuses on highly cited influential papers in a field	Citation threshold, historical impact	Highlights breakthrough studies and milestone contributions

6. Research Evaluation Frameworks for Research Excellence

Research excellence can only be evaluated through strong evaluation frameworks and incorporation of new digital technologies. Research appraisal models offer systematic methods of evaluating quality, impact and performance by quantitative and qualitative measures. Meanwhile, the development of the Artificial Intelligence (AI) and digital tools has transformed research processes with the ability to automate, make decisions based on data, and make better choices [49, 50]. The combination of these factors is important to enhance the efficiency, transparency, and global impact of research as a discussion Tables 8 and 9.

Table 8
 Research Evaluation Frameworks for Research Excellence

Category	Framework	Country	Focus Area	Key Features	Application in Research Evaluation
Global Standards	DORA	Global	Ethical evaluation	Focus on research merit, not journal impact factor	Promotes fair and quality-based assessment
	Leiden Manifesto	Global	Responsible metrics	10 principles for proper use of metrics	Balances quantitative & qualitative evaluation
	Hong Kong Principles	Global	Research integrity	Emphasizes transparency, open science, reproducibility	Encourages ethical and reliable research
	CoARA	Europe	Assessment reform	Recognizes diverse outputs (data, software)	Expands research evaluation criteria
National Frameworks	REF	United Kingdom	Research quality & impact	Evaluates quality, environment, societal impact	Determines institutional funding and ranking
	ERA	Australia	Global benchmarking	Combines metrics and peer review	Compares research with global standards
	VQR	Italy	Research output quality	Bibliometrics + peer review	Evaluates national research performance
	PBRF	New Zealand	Researcher performance	Evidence-based portfolio evaluation	Assesses individual and institutional quality
Impact Frameworks	ASARA Framework	Global	Social impact	Focus on policy, patents, societal benefits	Measures real-world application of research
	Payback Framework	Global	Multi-impact analysis	Knowledge, policy, economic, social benefits	Tracks full research impact lifecycle
	CIPP Model	Global	Program evaluation	Context, Input, Process, Product	Evaluates research program effectiveness
Rigor Frameworks	PRISMA	Global	Systematic review quality	Reporting checklist for transparency	Ensures quality in meta-analysis studies
	CONSORT	Global	Clinical trials	Standard reporting guidelines	Improves reliability of RCTs
	STROBE	Global	Observational studies	Structured reporting framework	Enhances study transparency
	GRADE Approach	Global	Evidence quality	Grades strength of evidence & recommendations	Used in policy and clinical research

Table 8
 Continued

Category	Framework	Country	Focus Area	Key Features	Application in Research Evaluation
AI-driven Metrics	Altmetric Attention Score	Global	Digital impact	Tracks news, social media, policy mentions	Measures real-time research visibility
	PlumX Metrics	Elsevier	Multi-dimensional impact	Citations, usage, captures, mentions	Evaluates broader engagement
	OpenAlex Metrics	Open-source	Open science	Tracks accessibility & reuse	Measures openness and collaboration
	Lens.org Metrics	Global	Innovation linkage	Patent and scholarly connections	Links research with innovation outcomes

Table 9
 AI and Digital Research Tools for Research Excellence

Category	Tool Name	Key Features	Use in Research
Literature Discovery & Mapping	Consensus	AI-based search across 200M+ papers, consensus meter	Quickly find evidence-based answers and scientific agreement
	Elicit	Automates literature review, summarizes papers	Identifies relevant studies without exact keywords
	ResearchRabbit	Personalized recommendations, paper collections	Continuous discovery of relevant research papers
	Litmaps	Citation network visualization	Tracks research evolution and key studies
	Connected Papers	Graph-based paper relationships	Identifies seminal and related works
Systematic Review & PRISMA Management	Rayyan	AI-assisted screening, collaboration	Efficient title and abstract screening
	ASReview	Active learning-based screening	Reduces time for large-scale systematic reviews
	Covidence	End-to-end systematic review platform	Manages screening, extraction, and quality assessment
	DistillerSR	Advanced automation, audit trails	Suitable for large and regulatory reviews
Writing, Editing & Synthesis	Paperpal	Academic writing enhancement, grammar check	Improves manuscript quality and tone
	Writefull	Academic language correction, citation check	Converts informal writing into scholarly format
	NotebookLM	Source-grounded AI, PDF-based Q&A	Generates summaries with reduced hallucination
	Zotero	Reference management, metadata extraction	Organizes citations and bibliography
	Mendeley	Reference manager with collaboration	Manages and shares research libraries
Data Analysis & Visualization	Julius AI	Natural language data analysis	Performs statistical analysis without coding
	KNIME	Low-code data workflow platform	Data preprocessing and analytics pipelines
	Tableau	Interactive dashboards, visualization	Data storytelling and insights presentation
	Jupyter AI	AI-assisted coding (Python/R)	Supports data analysis, modeling, and documentation

Table 9
 Continued

Category	Tool Name	Key Features	Use in Research
Journal Selection & Publishing	JournalGuide	Journal matching by abstract/keywords	Identifies suitable journals for submission
	Jane	Journal and reviewer suggestion	Helps find journals in biomedical fields
	Elsevier Journal Finder	AI-based journal recommendation	Matches manuscripts to Elsevier journals
	Springer Nature Suggester	Publisher-specific matching tool	Suggests appropriate Springer journals
	Cabells Journalytics	Whitelist/blacklist journals	Avoids predatory journals

7. Data Analytics and Visualization for Research Excellence

Research excellence heavily depends on data analytics and visualization as these techniques allow researchers to draw significant conclusions about the overwhelming data and present the results in a way that is easy to understand as explained in Table 10. The use of sophisticated methods of analysis, such as statistical analysis, machine learning, and big data processing, helps improve the accuracy and depth of research results [51]. The results are also easily interpreted and shared to support informed decision making and knowledge sharing with the help of visualization tools like dashboards, graphs and network maps.

Table 10
 Data Analytics and Visualization for Research Excellence

Category	Tool Name	Best For	Key Features	Technical Skill Required	Application in Research
Statistical Analysis & AI Discovery	Julius AI	Rapid data exploration	Conversational AI, auto code & visualization	Low	Quick statistical insights and hypothesis testing
	Python (Jupyter AI)	Advanced modeling	AI-assisted coding, reproducible workflows	High	Deep statistical analysis, ML models, simulations
	NVivo	Qualitative analysis	AI-assisted coding, sentiment analysis	Medium	Thematic analysis of interviews/surveys
	ATLAS.ti	Qualitative research	Text mining, coding support	Medium	Analysis of unstructured data
	KNIME	Data pipelines	Low-code workflows, ETL automation	Medium	Data cleaning, transformation, integration
Visualization & Storytelling	Flourish	Interactive storytelling	Scrollytelling, animated charts	Medium	Presentation of research findings interactively
	Datawrapper	Publication-ready charts	Clean, minimal design, export options	Low	Journal-quality figures and reports
	Tableau	Advanced dashboards	AI insights (Pulse), interactive visuals	Medium	Data exploration and decision support
	RAWGraphs	Custom visualizations	Unconventional charts (alluvial, network)	Low	Unique visual representation of complex data

Table 10
 Continued

Category	Tool Name	Best For	Key Features	Technical Skill Required	Application in Research
Geospatial & Scientific Visualization	ArcGIS (Esri)	Spatial analysis	Mapping, location intelligence	High	Geographic and environmental research
	CARTO	Geospatial analytics	Cloud-based spatial data analysis	Medium	Urban, environmental, and mobility studies
	BioRender	Scientific diagrams	Graphical abstracts, templates	Low	Visual summaries of research papers
	Grafana	Real-time dashboards	Live data monitoring, IoT integration	Medium	Sensor data visualization and monitoring
Comparison Insight	Julius AI	Fast analysis	Conversational interface	Low	Ideal for beginners and quick insights
	Python	Deep analysis	Full customization	High	Best for reproducible research
	Flourish	Storytelling	Interactive visuals	Medium	Conference and presentation use
	Datawrapper	Clean charts	Easy export	Low	Academic publication
	NVivo	Qualitative research	Thematic coding	Medium	Social science research
	ArcGIS	Spatial data	Advanced GIS tools	High	Geographic and environmental studies

8. Interdisciplinary Research and Ethical Practices

The need to integrate interdisciplinary approaches and to observe high standards in ethics continues to become key to the achievement of research excellence. Interdisciplinary studies allow the integration of knowledge, practices, and approaches of various disciplines to tackle complex and real-life issues more efficiently. At the same time, ethical practices help researchers to guarantee the integrity of research, its transparency and credibility by facilitating responsible conduct, good data management and preventing misconduct [52, 53] as discussed in Tables 11 and 12.

Table 11
 Interdisciplinary Research for Research Excellence

Category	Framework	Focus Area	Key Features	Application in Research Excellence
Frameworks for IDR Excellence	Integration & Implementation Sciences (i2S)	Complex problem solving	Integrates multiple disciplines and stakeholder perspectives	Solves real-world problems with holistic approaches
	PRISMA-IDR Extension	Systematic review	Adapts PRISMA for multi-disciplinary datasets	Enables rigorous interdisciplinary literature reviews
	Interdisciplinarity Matrix (Pass/Fail)	Project design evaluation	Ensures true integration in team, methods, and outputs	Prevents superficial interdisciplinarity
	SHAPE + STEM Integration	Cross-domain integration	Combines humanities with science & engineering	Produces socially and ethically grounded solutions

Table 11
 Continued

Category	Framework	Focus Area	Key Features	Application in Research Excellence
IDR Tools & Platforms	e-COST	Research networking	Supports international collaboration and mobility	Builds interdisciplinary research networks
	OpenAlex	Knowledge mapping	AI-powered discovery across disciplines	Identifies cross-field connections and collaborators
	Research Excellence Clusters (e.g., ARISE)	Research hubs	Centralized interdisciplinary research ecosystems	Facilitates large-scale collaborative innovation
Evaluation Metrics	Utility Outside Discipline	Impact measurement	Tracks citations beyond primary field	Measures cross-disciplinary influence
	Diversity of Team (IDR Score)	Collaboration quality	Based on diversity of co-author backgrounds	Encourages true interdisciplinary teamwork
	Societal Impact Narrative	Real-world impact	Policy, patents, societal benefits	Aligns research with SDGs and public needs
	Interdisciplinary Science Rankings (THE)	Institutional performance	Ranks universities on IDR outputs	Benchmarks interdisciplinary excellence
Best Practices	Translation Layer (Shared Glossary)	Communication	Standardizes terminology across fields	Reduces misunderstanding in teams
	Challenge-led Hackathons	Collaboration method	Rapid prototyping across disciplines	Enhances innovation and problem-solving

Table 12
 Ethical Practices in Research for Research Excellence

Category	Framework	Focus Area	Key Features	Application in Research Excellence
AI Ethics & Transparency	Human-in-the-Loop (HITL)	AI validation	Requires human verification of AI outputs	Ensures accuracy and prevents blind reliance on AI
	Disclosure of AI Usage	Transparency	Declaration of AI-assisted tasks (LLMs, data analysis, writing)	Promotes accountability and ethical reporting
	Algorithmic Bias Auditing	Fairness	Detects bias and under-representation in datasets/models	Prevents discrimination and improves inclusivity
Open Science & Data Governance	FAIR Principles	Data management	Findable, Accessible, Interoperable, Reusable	Enhances reproducibility and accessibility
	Diamond Open Access	Knowledge equity	Free publishing for authors and readers	Promotes global accessibility of research
	Pre-registration of Studies	Research transparency	Register hypothesis and methodology before study	Prevents p-hacking and increases credibility
	CARE Principles (Indigenous Data)	Data sovereignty	Collective benefit, authority, responsibility, ethics	Protects rights of indigenous communities

Table 12
 Ethical Practices in Research for Research Excellence

Category	Framework	Focus Area	Key Features	Application in Research Excellence
Protection of Participants	Dynamic Informed Consent	Participant rights	Continuous consent via digital platforms	Empowers participants and ensures ethical compliance
	Trauma-Informed Research Design	Participant well-being	Avoids psychological harm during research	Ensures ethical data collection
	Dual-Use Research of Concern (DURC)	Risk assessment	Evaluates misuse potential of research outcomes	Prevents harmful applications of research
Publication & Peer Review Ethics	Authorship Ethics	Contribution fairness	Only significant contributors are credited	Prevents gift/guest authorship
	Data Transparency	Integrity	Reports all results (positive & negative)	Avoids data manipulation and bias
	Responsible Peer Review	Quality assurance	Human-led review with limited AI assistance	Ensures critical and fair evaluation
Core Integrity Principles	Citation Ethics	Academic honesty	Avoids citation manipulation (citation rings)	Maintains scholarly integrity
	Honesty	Ethical foundation	Truthful reporting of research	Builds trust in research outcomes
	Reliability	Methodological rigor	Accurate and consistent research methods	Ensures reproducibility
	Objectivity	Bias-free interpretation	Evidence-based conclusions	Enhances credibility
	Impartiality	Fairness	Equal treatment of participants and peers	Promotes ethical collaboration
	Duty of Care	Responsibility	Protects participants, environment, society	Ensures long-term ethical impact

9. Applications of Research Excellence

Research excellence is a vital source of innovation, knowledge generation, and development of society. It goes beyond academic achievements to affect the policy-making process, industrial progress, health advancement and culture enrichment. Evidence-based decision-making and sustainable development in various sectors can be achieved through high-quality research, which is rigorous, original, and impactful [54]. With the world becoming more complicated, research excellence is highly applied in solving practical problems, improving the performance of institutions, and even the overall quality of life as mentioned in Table 13.

Table 13
 Applications of Research Excellence

Application Area	Description	Key Impact
National and Institutional Funding	Research excellence is used by governments and funding bodies to allocate resources and grants (e.g., REF, ERA)	Efficient funding distribution, increased research investment, improved institutional performance
Evidence-Based Policy Making	High-quality research informs public policies in health, environment, and social sectors	Better governance, informed decision-making, effective policy implementation

Table 13
 Continued

Application Area	Description	Key Impact
Industrial Innovation and Economic Growth	Research drives product development, patents, and industry-academia collaboration	Job creation, technological advancement, economic growth
Academic Advancement and Quality Assurance	Research excellence improves teaching, rankings, and institutional benchmarking	Enhanced education quality, global recognition, continuous improvement
Healthcare Advancement	Research supports clinical trials, treatment development, and public health strategies	Improved patient outcomes, advanced medical technologies
Environmental Sustainability	Research informs climate change policies, conservation strategies, and resource management	Sustainable development, biodiversity protection
Societal and Cultural Impact	Research enhances awareness, preserves heritage, and supports social development	Cultural preservation, social awareness, improved quality of life
Crisis Management and Preparedness	Research builds capacity to handle emergencies like pandemics and disasters	Improved resilience, faster response to crises
Education and Skill Development	Research-led teaching enhances knowledge and critical thinking	Skilled workforce, innovation-driven learning
Technology Transfer and Commercialization	Research outputs are converted into products, startups, and innovations	Revenue generation, industry growth, practical applications

10. Research Gap and Discussion

Although there has been a lot of research done on tools, techniques and evaluation frameworks of research excellence, existing studies are more or less fragmented and domain specific. The literature pays much attention to particular aspects like bibliometric analysis, quantitative/qualitative methodology or digital tools without bringing them together as one conceptualization. Moreover, little has been done regarding the practical choice and combination of the research tools with regard to particular goals. The fast development of artificial intelligence and big data analytics has also introduced a disparity between the old methodology and the new digital practices. Thus, an integrated and holistic strategy is needed to overcome these gaps and improve the quality and impact of research.

The results of the current research indicate that the concept of research excellence is becoming more and more characterized by the combination of sophisticated tools, a variety of different methodologies, and data-driven solutions. The increasing number of publications and citations is an indication of the increased significance of this domain in the world, especially after the adoption of artificial intelligence, bibliometric analysis, and interdisciplinary research. The prevalence of the disciplines of information and computing sciences and healthcare further underline the influence of technology in research innovation.

The author, institutional, and country analysis show that the developed countries have made a significant contribution, and the emerging economies are slowly gaining momentum in their contribution. Nevertheless, research outcomes are still influenced by obstacles like the availability of data, the complexity of the tools, and the methodological bias. The discussion highlights the importance of incorporating frameworks, ethics and ongoing technological adjustment in order to have reliable and effective research. In general, the paper supports the idea that research excellence can be guaranteed when the methodological rigor, the technological progress, and the interdisciplinary cooperation are balanced.

11. Solutions for Achieving Research Excellence

Research excellence can only be achieved through a holistic and strategic approach which involves entwining of methodological rigor, technological development, institutional support, and ethical responsibility. Excellence, in the changing world of research, is no longer determined by the number of publications but the quality, the impact, the transparency, and societal relevance of the results of research as explained in Table 14.

Table 14
 Solutions for Achieving Research Excellence

Strategy Area	Description	Key Practices	Expected Impact
Rigorous Methodological Standards	Ensures reliability, validity, and reproducibility of research	Use PRISMA/CONSORT guidelines, adopt open science practices, apply MCDM techniques	High-quality, transparent, and reproducible research
Strategic Publishing and Visibility	Enhances reach and recognition of research work	Publish in Scopus/WoS journals, maintain ORCID/Google Scholar profiles, optimize abstracts	Increased citations, global visibility, academic reputation
Institutional Support and Infrastructure	Provides resources and environment for quality research	Seed funding, mentorship programs, advanced labs and tools	Improved research capacity and innovation
Ethical Integrity and Self-Management	Maintains credibility and responsible conduct in research	Follow ethical guidelines, ensure data integrity, manage research stress effectively	Trustworthy and socially responsible research outcomes
Collaboration and Interdisciplinary Approaches	Combines expertise from multiple domains	Industry partnerships, interdisciplinary teams, global collaborations	Innovative solutions and high-impact research
Data Management and Reproducibility	Ensures proper handling and sharing of research data	Data cleaning, documentation, open data repositories	Reliable and verifiable research findings
Use of AI and Digital Tools	Enhances efficiency and analytical capability	Apply AI, machine learning, and big data analytics tools	Faster processing, deeper insights, improved decision-making
Continuous Learning and Skill Development	Keeps researchers updated with evolving methodologies	Attend workshops, training programs, conferences	Enhanced research skills and adaptability
Peer Review and Academic Contribution	Improves quality through critical evaluation	Participate in peer review, collaborate with experts	Improved research standards and scholarly contribution
Impact-Oriented Research Design	Aligns research with real-world problems	Focus on societal needs, policy relevance, and innovation	Greater practical impact and applicability

12. Challenges and Limitations Research Excellence

Although research excellence has been largely considered to be a standard of quality and effective research, there are various challenges and constraints that are linked with its practice and assessment. The growing use of performance indicators, institutional systems, and competitive funding conditions have posed complexities that can impede innovation and inclusivity as indicated in Table 15. Further, the differences in infrastructure, differences in discipline, and ethical issues all make excellence pursuance even more difficult. These challenges are necessary in order to come up with more balanced, fair and effective research systems that can enhance quality and innovation.

Table 15
 Challenges and Limitations of Research Excellence

Challenge Area	Description	Key Issues	Consequences
Metric-Fixation and Evaluation Bias	Over-reliance on quantitative metrics like impact factor and citations	Matthew effect, citation bias, metric manipulation	Distorted research quality, unethical practices, marginalization of emerging researchers
Institutional and Structural Barriers	Unequal access to resources and infrastructure across regions	Brain drain, lack of funding, limited access to tools and databases	Global inequality in research output and opportunities
Disciplinary Bias in Evaluation Frameworks	Standardized frameworks favor STEM over other disciplines	Undervaluation of books and long-term research	Misrepresentation of research impact in humanities and social sciences
Innovation vs. Safety Paradox	Preference for low-risk, publishable research over innovative ideas	Focus on trendy topics, avoidance of high-risk research	Reduced creativity and breakthrough discoveries
Funding and Resource Constraints	Dependence on short-term and competitive funding	Limited support for long-term research projects	Incomplete studies and reduced research continuity
Implementation Challenges in Methodology	Complexity of applying rigorous research frameworks	Time-consuming processes (e.g., PRISMA), administrative burden	Delays in research progress and reduced efficiency
Data Access and Privacy Issues	Restrictions on accessing sensitive or proprietary data	Data silos, privacy regulations	Limited data availability and incomplete analysis
Publication and Access Barriers	High publication costs and limited access to journals	APC charges, subscription barriers	Reduced participation from low-resource researchers
Language and Regional Bias	Dominance of English-language publications	Exclusion of non-English research	Underrepresentation of global knowledge
Ethical and Integrity Challenges	Pressure to publish leading to unethical practices	Plagiarism, data fabrication, salami slicing	Loss of credibility and trust in research

13. Future Research Directions Research Excellence

The idea of research excellence is experiencing a major change, where it is shifting the old-style metric-based assessment to a more inclusive, holistic, and impact-based based approach as outlined in Table 16. Artificial intelligence, open science, interdisciplinary collaboration, and sustainability are emerging trends that are transforming the way research is done, assessed, and implemented. The vision of the future of research will concentrate not only on academic performance, but also on societal impact, moral accountability, and accessibility worldwide.

14. Conclusion

This paper is an integrated and holistic view of research excellence through a systematic analysis of research tools, methods, applications, assessment models, and new solutions. The results demonstrate that the number of publications and citations has increased significantly since 2020, which is why the world shows more interest in the data-driven, technology-enabled, and interdisciplinary research practices. The prevalence of information and computing sciences and the field of healthcare underscores the importance of digital tools, artificial intelligence, and analytics in the modern research. Moreover, the work of most prominent authors, institutions, and countries reflects a globally spread but influence-based research ecosystem.

The research finds that research excellence necessitates a balanced approach towards rigorous methodologies, advanced tools, ethical practices, and collaborative approaches. Although the current frameworks and metrics offer useful benchmarks, they are usually disjointed and can be used in terms of the overall impact of research. The suggested combination of quantitative, qualitative, mixed-method, and bibliometric research approaches is a more holistic way to enhance the quality and relevance of research. Also, the paper highlights the significance of strategic publishing, open science, and institutional support to increase the visibility and accessibility of research.

Table 16
 Future Research Directions in Research Excellence

Future Direction	Description	Key Trends	Expected Impact
AI-Augmented Research Lifecycle	Integration of AI across all research stages	Automated literature review, predictive impact analysis, AI-based integrity checks	Faster, more accurate, and efficient research processes
Narrative and Impact-Based Metrics	Shift from citation-based metrics to real-world impact evaluation	Impact case studies, Altmetrics 2.0, policy and societal influence tracking	More meaningful assessment of research contributions
Open Science and Diamond Open Access	Removal of financial barriers in publishing and access	Free publishing (Diamond OA), open data sharing, collaborative platforms	Increased accessibility, equity, and global participation
Interdisciplinary and Global Collaboration	Integration of multiple disciplines and international partnerships	Cross-domain research teams, global research hubs, citizen science	Innovative solutions and broader research impact
Sustainability and Green Research	Focus on environmentally responsible research practices	Energy-efficient labs, sustainable materials, circular research economy	Reduced environmental impact and sustainable development
Inclusive and Equity-Oriented Research	Promoting diversity and inclusion in research participation and evaluation	Recognition of underrepresented groups, equitable funding distribution	More balanced and socially responsible research systems
Advanced Data Analytics and Big Data	Use of large-scale data and advanced analytics tools	Real-time data processing, deep learning, predictive modeling	Deeper insights and improved decision-making
Digital Research Ecosystems	Development of smart, connected research environments	Cloud computing, virtual labs, IoT integration	Enhanced collaboration, scalability, and efficiency
Ethical AI and Responsible Innovation	Ensuring ethical use of AI and emerging technologies	Bias detection, transparency, accountability frameworks	Trustworthy and responsible research practices
Translational and Impact-Driven Research	Focus on converting research into real-world applications	Technology transfer, commercialization, policy integration	Greater societal and economic benefits

But then there are obstacles like metric dependency, resource differences, and complexities of methods that keep on undermining the attainment of the real research excellence. The solution to these limitations is the need to deploy inclusive, flexible, and innovation-oriented frameworks. Going forward, AI-enhanced research ecosystems, narrative impact evaluation, interdisciplinary collaboration and sustainable research practices will dominate the future of research excellence.

To sum up, the current study can help researchers, scholars, and practitioners in their research excellence by providing an integrated framework that links tools, techniques, applications, and solutions. It offers useful information to researchers, academicians, and policymakers to improve the quality, effects, and social applicability of research, and thus help to create a more effective, ethical, and globally inclusive researcher community.

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Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Riad, A., Alkasaby, M., Changchroenkul, N., & Koščík, M. (2026). National-, institutional-, and individual-level determinants of psychiatric research excellence: Analysis of Stanford-Elsevier lists of the top 2% scholars worldwide (2017-2023). *Asian Journal of Psychiatry*, 104826. <https://doi.org/10.1016/j.ajp.2025.104826>
- [2] Haupt, F., Senge, J. F., von Tengg-Kobligk, H., & Bosbach, W. A. (2026). Enabling transparent research evaluation: A method for historical RCR retrieval using public NIH metadata. *PloS one*, 21(1), e0340697. <https://doi.org/10.1371/journal.pone.0340697>
- [3] Pinar, M., & Horne, T. J. (2022). Assessing research excellence: evaluating the research excellence framework. *Research Evaluation*, 31(2), 173-187. <https://doi.org/10.1093/reseval/rvab042>
- [4] Thelwall, M., Kousha, K., Wilson, P., Makita, M., Abdoli, M., Stuart, E., & Cancellieri, M. (2023). Predicting article quality scores with machine learning: The UK Research Excellence Framework. *Quantitative Science Studies*, 4(2), 547-573. https://doi.org/10.1162/qss_a_00258
- [5] Grzeszczyk, T. A. (2026). Support Vector Machines for Evaluating Research Excellence in Higher Education. In *The Future of Work: How Technology is Transforming Jobs and Skills* (pp. 847-856). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-87372-0_73
- [6] Sørensen, M. P., Bloch, C., & Young, M. (2016). Excellence in the knowledge-based economy: from scientific to research excellence. *European Journal of Higher Education*, 6(3), 217-236. <https://doi.org/10.1080/21568235.2015.1015106>
- [7] Wigren-Kristoferson, C., Gabrielsson, J., & Kitagawa, F. (2011). Mind the gap and bridge the gap: Research excellence and diffusion of academic knowledge in Sweden. *Science and Public Policy*, 38(6), 481-492. <https://doi.org/10.3152/030234211X12960315267859>
- [8] Bonaccorsi, A., Cicero, T., Haddawy, P., & Hassan, S. U. (2017). Explaining the transatlantic gap in research excellence. *Scientometrics*, 110(1), 217-241. <https://doi.org/10.1007/s11192-016-2180-2>
- [9] Pinar, M., & Unlu, E. (2020). Evaluating the potential effect of the increased importance of the impact component in the Research Excellence Framework of the UK. *British Educational Research Journal*, 46(1), 140-160. <https://doi.org/10.1002/berj.3572>
- [10] Torrance, H. (2020). The research excellence framework in the United Kingdom: Processes, consequences, and incentives to engage. *Qualitative Inquiry*, 26(7), 771-779. <https://doi.org/10.1177/10778004198787>
- [11] Antes, A. L., Kuykendall, A., & DuBois, J. M. (2019). Leading for research excellence and integrity: A qualitative investigation of the relationship-building practices of exemplary principal investigators. *Accountability in research*, 26(3), 198-226. <https://doi.org/10.1080/08989621.2019.1611429>
- [12] Lee, D. J., Stvilia, B., Hegde, N., & Malneedi, S. N. R. (2025). Exploring doctoral student researchers' use and adoption of research information management systems. *Library & Information Science Research*, 47(3), 101369. <https://doi.org/10.1016/j.lisr.2025.101369>
- [13] García-Villar, C. (2021). A critical review on altmetrics: can we measure the social impact factor?. *Insights into Imaging*, 12(1), 92. <https://doi.org/10.1186/s13244-021-01033-2>
- [14] Sahoo, S. K., Choudhury, B. B., & Dhal, P. R. (2024). A bibliometric analysis of material selection using MCDM methods: trends and insights. *Spectrum of mechanical engineering and operational research*, 1(1), 189-205. <https://doi.org/10.31181/smeor11202417>
- [15] Bahari, A. (2025). Balancing syntactic complexity and clarity: the role of AI in enhancing academic writing proficiency. *Saudi Journal of Language Studies*, 5(4), 271-290. <https://doi.org/10.1108/SJLS-10-2024-0062>
- [16] Dilber, C., & Yoşumaz, İ. (2026). The Impact of Language Translation on Plagiarism Rates: Evidence from Turnitin, iThenticate, and Grammarly. *Journal of Academic Ethics*, 24(1), 4. <https://doi.org/10.1007/s10805-025-09681-5>
- [17] Patterson, B. (2025). Can AI help with that? The limitations of AI tools for information discovery, search and reviews. *Journal of Electronic Resources in Medical Libraries*, 22(1-2), 56-59. <https://doi.org/10.1080/15424065.2025.2496622>
- [18] Lim, W. M. (2025). What is quantitative research? An overview and guidelines. *Australasian Marketing Journal*, 33(3), 325-348. <https://doi.org/10.1177/14413582241264622>

- [19] Slater, P., & Hasson, F. (2025). Quantitative research designs, hierarchy of evidence and validity. *Journal of Psychiatric and Mental Health Nursing*, 32(3), 656-660. <https://doi.org/10.1111/jpm.13135>
- [20] Li, H., Wang, Y., Luo, S., & Huang, C. (2025). The influence of GenAI on the effectiveness of argumentative writing in higher education: Evidence from a quasi-experimental study in China. *Journal of Asian Public Policy*, 18(2), 405-430. <https://doi.org/10.1080/17516234.2024.2363128>
- [21] Kumar, R. (2025). Bibliometric analysis: comprehensive insights into tools, techniques, applications, and solutions for research excellence. *Spectrum of Engineering and Management Sciences*, 3(1), 45-62. <https://doi.org/10.31181/sems31202535k>
- [22] Steinkamp, M. W., & Maehr, M. L. (1983). Affect, ability, and science achievement: A quantitative synthesis of correlational research. *Review of Educational Research*, 53(3), 369-396. <https://doi.org/10.3102/00346543053003369>
- [23] Njeri Mugwe, J., & Runo, S. (2026). Nonexperimental Designs 1: Surveys. In *Research Methodology in Agricultural Sciences* (pp. 293-312). Springer Nature Singapore. https://doi.org/10.1007/978-981-95-1892-0_12
- [24] Rees, C. E., & Ottrey, E. (2026). "Lives and times": the case for qualitative longitudinal research in anatomical sciences education. *Anatomical Sciences Education*, 19(2), 218-230. <https://doi.org/10.1002/ase.2514>
- [25] Martínez-Sánchez, I., Romero-García, M., Alonso-Fernández, S., Martínez-Momblan, M. A., Lleberia, J., & Puig-Llobet, M. (2026). Nurse Educators' Self-Reported Level of Teaching Competence and Its Correlation with Sociodemographic, Professional, Training and Research Variables: A Cross-Sectional Multicentre Study. *Nursing Reports*, 16(2), 41. <https://doi.org/10.3390/nursrep16020041>
- [26] Mutanana, N., & Shoko, C. T. (2026). Addressing the Efficacy of Quality in Qualitative Research: A Review of the Current Discourse. *International Journal of Qualitative Methods*, 25, 16094069261432368. <https://doi.org/10.1177/1609406926143236>
- [27] Dougherty, D. (2017). Grounded theory research methods. *The Blackwell companion to organizations*, 849-866. <https://doi.org/10.1002/9781405164061.ch37>
- [28] Almusaed, A., Almssad, A., & Yitmen, I. (2025). Ethnography and Case Study Methods. In *Practice of Research Methodology in Civil Engineering and Architecture: A Comprehensive Guide* (pp. 317-353). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-97393-2_10
- [29] Downey, G., Dalidowicz, M., & Mason, P. H. (2015). Apprenticeship as method: embodied learning in ethnographic practice. *Qualitative Research*, 15(2), 183-200. <https://doi.org/10.1177/1468794114543400>
- [30] Mahadevan, J., & Moore, F. (2023). A framework for a more reflexive engagement with ethnography in International Business Studies. *Journal of World Business*, 58(4), 101424. <https://doi.org/10.1016/j.jwb.2022.101424>
- [31] Pino Gavidia, L. A., & Adu, J. (2022). Critical narrative inquiry: An examination of a methodological approach. *International Journal of Qualitative Methods*, 21, 16094069221081594. <https://doi.org/10.1177/16094069221081594>
- [32] Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International journal of qualitative methods*, 22, 16094069231205789. <https://doi.org/10.1177/16094069231205789>
- [33] Best, S., & Williams, S. J. (2025). Improving the way we do action research in quality improvement. *Production Planning & Control*, 36(2), 165-176. <https://doi.org/10.1080/09537287.2024.2315154>
- [34] Christodoulou, M. (2025). Grounded theory as a framework for explanatory sequential mixed-method design, an example from educational research. *Quality & Quantity*, 1-17. <https://doi.org/10.1007/s11135-025-02214-7>
- [35] Chiarini, A., & Kumar, M. (2022). What is Quality 4.0? An exploratory sequential mixed methods study of Italian manufacturing companies. *International Journal of Production Research*, 60(16), 4890-4910. <https://doi.org/10.1080/00207543.2021.1942285>
- [36] Bhana, A. (2024). Unlocking the power of convergent parallel designs and triangulation for enhanced management and leadership research: A comprehensive theoretical exploration. *Asian Journal of Management, Entrepreneurship and Social Science*, 4(04), 1770-1793. <https://doi.org/10.63922/ajmesc.v4i04.864>
- [37] Johnson, R. E., Grove, A. L., & Clarke, A. (2019). Pillar integration process: A joint display technique to integrate data in mixed methods research. *Journal of Mixed Methods Research*, 13(3), 301-320. <https://doi.org/10.1177/15586898177431>
- [38] Sim, C. L., Wong, T. A., Sin, K. Y., & Sivakumaran, V. M. (2024). Pragmatism as a paradigm for quality management research in bridging academic-practitioner gaps. *International Journal of Quality and Service Sciences*, 16(2), 330-342. <https://doi.org/10.1108/IJQSS-07-2024-192>
- [39] Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and policy in mental health and mental health services research*, 42(5), 533-544. <https://doi.org/10.1007/s10488-013-0528-y>

- [40] Johnson, R. E., Grove, A. L., & Clarke, A. (2019). Pillar integration process: A joint display technique to integrate data in mixed methods research. *Journal of Mixed Methods Research*, 13(3), 301-320. <https://doi.org/10.1177/1558689817743108>
- [41] Tang, G. (2025). Using mixed methods research to study research integrity: Current status, issues, and guidelines. *Accountability in Research*, 32(5), 807–828. <https://doi.org/10.1080/08989621.2024.2449041>
- [42] Coker, D. C., Bobek, V., Kaaki, W., & Dawkins, E. (2025). Quantity and Quality in Social Research (Mixed Methods Research): A Framework for Integration. In A. Akande (Ed.), *Modern Cross-Cultural Management. Diversity and Inclusion Research*. Springer, Cham. https://doi.org/10.1007/978-3-031-82900-0_9
- [43] Sahoo, S. K., Sahu, S., Choudhury, B. B., Dhal, P. R., & Dhar, I. (2026). Transforming Decision-Making in Generation Z Education: A Systematic and Bibliometric Review of Artificial Intelligence. *Journal of Contemporary Decision Science*, 2(1), 114-130.
- [44] Sahoo, S. K., Goswami, S. S., Božanić, D., & Mitra, S. (2025). Evaluating Green Economy Strategies Through Multi-Criteria Decision Analysis: A Systematic Review. *International Journal of Economic Sciences*, 14(1), 385-407. <https://doi.org/10.31181/ijes1412025245>
- [45] Özekenci, E. K., Onat, K. T., & Özekenci, S. Y. (2027). Emerging Trends and Research Insights in Fuzzy Multi-Criteria Decision-Making Applications for Logistics Location Selection: A Comprehensive Bibliometric Analysis (1982-2025). *Spectrum of Operational Research*, 1-20. <https://doi.org/10.31181/sor202772>
- [46] Acuña-Muñoz, M. J., Carvajal-Trujillo, E., Orts-Cardador, J. J., & Liébana-Cabanillas, F. (2026). A five-decade review of academic research on healthcare supply chain: a bibliometric approach using co-word analysis and bibliographic coupling. *International Journal of Health Care Quality Assurance*, 39(1), 1-21. <https://doi.org/10.1108/IJHCQA-01-2024-0003>
- [47] Huang, Y., Yang, F., Lan, M., Reniers, G., & Ni, X. (2026). Visualized analysis on thermal runaway related research trends for lithium-ion batteries: A bibliometric study. *Journal of Energy Storage*, 142, 119646. <https://doi.org/10.1016/j.est.2025.119646>
- [48] Gao, D., Cai, J., & Wu, K. (2025). The smart green tide: A bibliometric analysis of AI and renewable energy transition. *Energy Reports*, 13, 5290-5304. <https://doi.org/10.1016/j.egy.2025.04.052>
- [49] Blackburn, R., Dibb, S., & Tonks, I. (2025). The Effect of Research Evaluations on Inclusion: A Focus on University Submissions to the Research Excellence Framework. Available at SSRN 5125250. <http://dx.doi.org/10.2139/ssrn.5125250>
- [50] Loo, B. P. (2024). Research excellence in a world of change. *Transactions of the Institute of British Geographers*, e12729. <https://doi.org/10.1111/tran.12729>
- [51] Qiu, L., Zhou, E., Yu, T., & Smyth, N. (2019). Data analytics and research evaluation. *Library Hi Tech News*, 36(4), 1-6. <https://doi.org/10.1108/LHTN-11-2018-0073>
- [52] Widimsky, P., Stetkarova, I., & Tousek, P. (2023). The importance of interdisciplinary research. *European Heart Journal Supplements*, 25(Supplement_E), E1-E2. <https://doi.org/10.1093/eurheartjsupp/suad108>
- [53] Conroy, J. C., & Smith, R. (2017). The ethics of research excellence. *Journal of Philosophy of Education*, 51(4), 693-708. <https://doi.org/10.1111/1467-9752.12249>
- [54] Khosravi, A., & Chavan, M. (2012). A comprehensive view on research excellence. *Total quality management & business excellence*, 23(5-6), 507-521. <https://doi.org/10.1080/14783363.2012.669537>