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KEYWORDS AS GATEWAYS IN SCHOLARLY PUBLISHING: A BIBLIOMETRIC PERSPECTIVE

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Abstract:

Keywords have become a crucial element in bibliometric analysis, serving as gateways to information retrieval, trend mapping, and research evaluation. This paper explores the historical evolution, classification, and multifaceted role of keywords in bibliometrics. The study highlights both their strengths and limitations. Special attention is given to challenges such as ambiguity, inconsistency, and the impact of keyword selection on research visibility. The paper also discusses future trends.

Keywords: *Bibliometrics, Keywords, Research Trends, Scholarly Communication.*

Introduction:

Bibliometrics, the quantitative study of scholarly communication, relies on various indicators to measure research impact and trends (Pritchard, 1969). Among these indicators, keywords hold a unique position as both descriptors and analytical tools. They facilitate content discovery, enable subject categorization, and influence citation visibility (Salton & McGill, 1983). Over time, their role has expanded from simple indexing terms to strategic elements in academic publishing and research analytics (Callon et al., 1983). The importance of keywords extends beyond retrieval efficiency—they are now central to mapping scientific networks, identifying emerging fields, and informing research policy (Börner et al., 2003). This study aims to trace the evolution of keywords in bibliometrics, examine their classification, explore their integration with bibliometric indicators, and address the challenges they present (Glänzel, 2003).

History of Keywords in Bibliometrics:

The use of keywords in scholarly communication can be traced back to the early days of indexing and abstracting services, when subject headings and descriptors were manually assigned to publications (Garfield, 1972). These early keywords were not author-supplied but instead curated by professional indexers to enhance retrieval efficiency in printed bibliographies.The modern bibliometric movement began in the 1960s and 1970s with the advent of citation indexing and citation analysis (Pritchard, 1969; Garfield, 1972). In these early systems, keywords served as supplementary tools

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alongside citations, helping researchers identify thematically related works. The practice was largely shaped by developments in library science and information retrieval (Salton & McGill, 1983). The introduction of co-word analysis in the 1980s revolutionized the use of keywords in bibliometric studies. Callon et al. (1983) demonstrated how co-occurring keywords could be mapped to visualize research fronts and intellectual structures within disciplines. In the 1990s and early 2000s, digital databases such as Web of Science and Scopus standardized keyword usage by integrating both author keywords and controlled vocabulary from indexing systems (Hood & Wilson, 2001).

In the contemporary era, keyword analysis has expanded to include algorithmically generated terms, semantic clustering, and machine learning–based extraction methods (Zhang & Lu, 2020). These advancements have transformed keywords from simple retrieval aids into powerful analytical units for understanding research trends, emerging topics, and scientific networks (Börner et al., 2003).

Objectives:

The Objectives of this study are as follows:

1) To understand the evolution and role of keywords in bibliometrics.
2) To know the challenges and future directions of keyword usage in scholarly communication.

Literature Review:

Library and information sciences use controlled vocabularies to improve information retrieval, to reduce ambiguity, and to organize knowledge systematically (Svenonius, 2003). The study of keywords and their extraction has become increasingly important in managing, retrieving, and analyzing large volumes of textual data across disciplines. Yu et al. (2007) highlight the significance of keyword-based search in structured databases, proposing methods to summarize keyword relationships and rank useful databases, which laid the groundwork for optimizing information retrieval. Grant (2010) highlighted as a practical benefit of these methods. A study in India found that e-repositories and academic publishing are important in India. Building on the need for discoverability in digital content, Van Damme et al. (2012) emphasize carefully selecting descriptive keywords in titles, abstracts, and keyword lists to improve visibility and citations. Similarly, Merriam (2013) demonstrates how well-crafted titles and keywords prevent critical ideas from being overlooked, ensuring research can be located efficiently by both researchers and search engines. Expanding this perspective to academic publishing trends, Mela, Roos, and Deng (2013) examine the evolution of marketing science through keyword analysis, revealing challenges such as declining publication likelihood and potential selection biases. The broader study of keyword extraction techniques by Siddiqi and Sharan (2015) underscores their role in summarizing content, organizing documents, and enhancing information retrieval

through both supervised and unsupervised approaches. Zhang et al. (2016) explore Social Network Analysis in Documentation Sciences, linking keyword patterns to foundational works and interdisciplinary research. Gheni, Hussein, and Oleiwi (2019) propose methods to suggest new keywords from titles and abstracts, demonstrating alignment with author-assigned terms. Cabeza, Chàfer, and Mata (2020) analyze keyword clusters in climate change and building technology, identifying both key areas and knowledge gaps. Corrin (2022) extends these findings to educational technology, stressing consistent, effective keyword selection to improve article discoverability and research focus representation. In the context of domain-specific research, Liu et al. (2022) introduce the TELS schema to study the evolution of research keywords in social sciences, highlighting shifts in focus from anthropology to neuroscience and social problems, with trends broadly applicable across fields. Nomoto (2022) further reviews fifty years of keyword extraction research, highlighting statistical and natural language processing methods while identifying strategies proven successful. The findings of Roy & Ghosh (2024, 2025) indicate that consolidated vocabularies outperform author-provided keywords and that standardization is critical to improving discoverability in open access repositories.

From the reviewed studies, it is apparent that standardized controlled vocabulary and carefully selected keywords help improve information retrieval, reduce ambiguity, and increase access to scholarly research.

Definition and types of Keywords:

Definition of a Keyword:

In the context of bibliometrics, a keyword is a term or phrase that captures the essential topics, concepts, or themes of a scholarly work. Keywords serve as metadata for indexing, retrieval, and analytical purposes, enabling researchers to locate relevant literature efficiently (Salton & McGill, 1983). They can be provided by authors, assigned by indexers, or automatically generated by algorithms (Wang et al., 2012).

Types of Keywords:

Keywords in research are mainly categorized into five types. Author keywords are provided by the authors to reflect the intended focus and preferred terminology, helping track emerging trends (Siddiqi & Sharan, 2015). Indexer keywords are assigned by professional indexers using controlled vocabularies to ensure standardization and improve retrieval accuracy (Gheni et al., 2019). Controlled vocabulary keywords come from established thesauri, such as MeSH or IEEE taxonomies, reducing ambiguity and enabling cross-database searches (Nomoto, 2022). Free-text keywords, extracted from titles, abstracts, or full text, offer flexibility to capture new concepts but may lack precision (Liu et al., 2022). Finally, algorithmically generated keywords use AI or statistical models to detect trends and automate indexing, supporting large-scale research analysis (Yu et al., 2007).

Role of Keywords in Research and Altmetrics:

Keywords significantly influence how research is discovered and accessed in digital databases such as Google Scholar, ResearchGate, and institutional repositories (Zhang & Lu, 2020). Well-chosen keywords improve visibility in altmetrics, including social media, blogs, and news outlets, enhancing broader research impact (Van Damme et al., 2012; Merriam, 2013). Keywords are also linked to bibliometric indicators: co-occurrence mapping uses co-word analysis with tools like VOSviewer (Nomoto, 2022).

Challenges and Limitations of Keywords:

Despite their importance, keywords face several challenges. Many keywords are ambiguous or polysemous, such as "Java," which can refer to a programming language, an island, or coffee, leading to irrelevant search results (Hood & Wilson, 2001). Inconsistencies also occur when authors use different terms for the same concept, for example, "artificial intelligence" versus "AI," which reduces retrieval precision (Wang et al., 2012). Overuse or underuse of keywords can dilute focus or limit discoverability, as journals often allow 3–10 keywords per paper (Glänzel, 2003). Poorly chosen keywords further decrease visibility in databases like Scopus and Web of Science, potentially biasing bibliometric analyses (Börner et al., 2003).

Emerging Trends and Future Directions:

Keyword research is changing with new technologies. Artificial Intelligence (AI) and machine learning can now automatically pick out important keywords from large amounts of text. This makes the process faster, reduces human mistakes, and helps with large-scale research studies (Zhang & Lu, 2020).Automated keyword tagging allows publishing platforms to suggest keywords from the abstract or full text. This makes submissions quicker and more consistent (Li et al., 2021). Predictive analytics looks at how keywords appear together over time to predict new research areas. For example, the overlap of "quantum computing" and "machine learning" shows a new emerging field (Bornmann et al., 2020). Semantic clustering and knowledge graphs group keywords by meaning and link them to authors, papers, and institutions. This helps understand research connections and trends more clearly (Mikolov et al., 2013).

Overall, these trends make keyword research faster, more accurate, and more useful, helping researchers find, analyze, and predict important topics.

Conclusion:

Keywords have evolved from simple indexing aids to essential components in bibliometric research, influencing how knowledge is discovered, mapped, and evaluated. Historically, they played a supporting role in citation indexing, but with the advent of co-word analysis, digital databases, and AI-driven tools, their importance has grown significantly (Garfield, 1972; Callon et al., 1983). While keywords enhance research visibility and facilitate trend analysis, they also present challenges—ambiguity,

inconsistency, and poor assignment practices can reduce retrieval accuracy and bias bibliometric results. Addressing these issues requires a balance between author freedom and the adoption of standardized, AI-assisted keyword assignment systems. Looking ahead, the integration of machine learning, semantic clustering, and predictive analytics promises to make keywords even more powerful in shaping scientific discovery. For researchers, thoughtful keyword selection remains a strategic step; for indexers and database managers, it is a critical factor in ensuring the integrity and accessibility of scholarly communication.

References:

Börner, K., Chen, C., & Boyack, K. W. (2003). Visualizing knowledge domains. *Annual Review of Information Science and Technology, 37*(1), 179–255. https://doi.org/10.1002/aris.1440370106

Bornmann, L., Haunschild, R., & Leydesdorff, L. (2020). Predictive bibliometrics: Forecasting research trends using bibliometric techniques. *Scientometrics, 124*(1), 631–642. https://doi.org/10.1007/s11192-020-03431-4

Cabeza, L. F., Chàfer, M., & Mata, É. (2020). Comparative analysis of Web of Science and Scopus on the energy efficiency and climate impact of buildings. *Energies, 13*(2), 409. https://doi.org/10.3390/en13020409

Callon, M., Courtial, J. P., Turner, W. A., & Bauin, S. (1983). From translations to problematic networks: An introduction to co-word analysis. *Social Science Information, 22*(2), 191–235. https://doi.org/10.1177/053901883022002003

Corrin, L. (2022). The importance of choosing the right keywords for educational technology publications. *Australasian Journal of Educational Technology (AJET)*.

Garfield, E. (1972). Citation analysis as a tool in journal evaluation. *Science, 178*(4060), 471–479. https://doi.org/10.1126/science.178.4060.471

Glänzel, W. (2003). *Bibliometrics as a research field: A course on theory and application of bibliometric indicators*. Leuven: Katholieke Universiteit Leuven.

Gheni, H. Q., Hussein, A. M., & Oleiwi, W. K. (2019). Suggesting new words to extract keywords from title and abstract. *International Journal of Electrical and Computer Engineering, 9*(5), 4441. https://doi.org/10.11591/ijece.v9i5.pp4441-4450

Grant, M. J. (2010). Key words and their role in information retrieval. Health Information & Libraries Journal, 27(3), 173-175.

Hood, W. W., & Wilson, C. S. (2001). The literature of bibliometrics, scientometrics, and informetrics. *Scientometrics, 52*(2), 291–314. https://doi.org/10.1023/A:1017919924342

Li, J., Tang, J., & Zhang, Q. (2021). Automatic metadata generation for academic publishing using AI-based keyword extraction. *Information Processing & Management, 58*(3), 102540. https://doi.org/10.1016/j.ipm.2021.102540

Liu, B., Shi, M., Kuang, Y., & Jiang, X. (2022). TELS: Evolution patterns of research keywords from the evidence of PNAS Social Sciences topics. *Frontiers in Big Data, 5*, 1045513. https://doi.org/10.3389/fdata.2022.1045513

Mela, C. F., Roos, J., & Deng, Y. (2013). A keyword history of marketing science. *Marketing Science, 32*(1), 8–18. https://doi.org/10.1287/mksc.1120.0741

Merriam, D. (2013). Key words or keywords. *The Compass: Earth Science Journal of Sigma Gamma Epsilon, 84*(4), 2.

Mikolov, T., Chen, K., Corrado, G., & Dean, J. (2013). Efficient estimation of word representations in vector space. *arXiv preprint*, arXiv:1301.3781. https://arxiv.org/abs/1301.3781

Nomoto, T. (2022). Keyword extraction: A modern perspective. *SN Computer Science, 4*(1), 92. https://doi.org/10.1007/s42979-022-01192-x

Pritchard, A. (1969). Statistical bibliography or bibliometrics? *Journal of Documentation, 25*(4), 348–349.

Roy, A., & Ghosh, S. (2024). Freedom versus standard in article keyword generation: an empirical study. Journal of Library Metadata, 24(4), 291-305.

Roy, A., & Ghosh, S. (2025). From chaos to clarity: how controlled vocabularies shape Indian social science repositories. The Electronic Library, 43(2), 154-173.

Salton, G., & McGill, M. J. (1983). *Introduction to modern information retrieval*. New York: McGraw-Hill.

Siddiqi, S., & Sharan, A. (2015). Keyword and keyphrase extraction techniques: A literature review. *International Journal of Computer Applications, 109*(2), 1–8. https://doi.org/10.5120/21392-0209

Svenonius, E. (1989). Design of controlled vocabularies. Encyclopedia of library and information science, 45(suppl 10), 82-109.

Van Damme, H., Detry, O., Leruf, J., & Ceelen, W. (2012). Choice of key-words for a scientific paper. *Acta Chirurgica Belgica, 112*(2), 107. https://doi.org/10.1080/00015458.2012.11680949

Wang, X., Liu, C., Mao, W., & Fang, Z. (2012). The role of keywords in scientific literature: A case study of environmental science. *Scientometrics, 90*(2), 343–358. https://doi.org/10.1007/s11192-011-0510-0

Yu, B., Li, G., Sollins, K., & Tung, A. K. (2007, June). Effective keyword-based selection of relational databases. In *Proceedings of the 2007 ACM SIGMOD International Conference on Management of Data* (pp. 139–150). ACM. https://doi.org/10.1145/1247480.1247497

Zhang, J., Yu, Q., Zheng, F., Long, C., Lu, Z., & Duan, Z. (2016). Comparing keywords plus of WOS and author keywords: A case study of patient adherence research. *Journal of the Association for Information Science and Technology, 67*(4), 967–972. https://doi.org/10.1002/asi.23450

Zhang, Y., & Lu, J. (2020). Automatic keyword extraction using deep learning methods. *Information Processing & Management, 57*(6), 102360. https://doi.org/10.1016/j.ipm.2020.102360