

The Balanced Scorecard as a Strategic Management System in the Industry 5.0 Era: A Bibliometric Analysis (2000–2025)

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ABSTRACT

This study maps the intellectual structure, publication trends, and global collaboration patterns of Balanced Scorecard (BSC) research to examine its evolution from a performance measurement tool into a strategic management system (SMS) aligned with the Industry 5.0 paradigm. We conducted a descriptive quantitative bibliometric analysis of 736 documents indexed in Scopus between 2000 and 2025. Biblioshiny was used for performance and thematic analyses, whereas VOSviewer was used to map bibliometric networks. Publication output peaked in 2017 and showed renewed growth toward 2025. Thematic developments indicate a shift from a predominantly technocentric orientation toward the integration of Triple Bottom Line (TBL) and Environmental, Social, and Governance (ESG) considerations. The United States and the United Kingdom remain the leading contributors, although research activity has become increasingly decentralized, with rapid growth in China, Iran, and India. By providing a continuous 25-year synthesis, this study shows how the BSC has been reconfigured in response to sustainability imperatives and the human-centric orientation of Industry 5.0. The findings suggest that the BSC remains a relevant strategic instrument for aligning economic, social, and environmental objectives, particularly when embedded within ESG-integrated management architectures.

ABSTRAK

Studi ini memetakan struktur intelektual, tren publikasi, dan pola kolaborasi global dalam penelitian Balanced Scorecard (BSC) untuk mengkaji evolusinya dari sekadar alat pengukuran kinerja menjadi sistem manajemen strategis (SMS) yang selaras dengan paradigma Industri 5.0. Kami melakukan analisis bibliometrik kuantitatif deskriptif terhadap 736 dokumen yang terindeks di Scopus antara tahun 2000 dan 2025. Perangkat lunak Biblioshiny digunakan untuk analisis kinerja dan tematik, sementara VOSviewer digunakan untuk memetakan jaringan bibliometrik. Output publikasi mencapai puncaknya pada tahun 2017 dan menunjukkan pertumbuhan kembali menjelang tahun 2025. Perkembangan tematik mengindikasikan adanya pergeseran dari orientasi yang didominasi oleh aspek teknosentris menuju integrasi pertimbangan Triple Bottom Line (TBL) serta Lingkungan, Sosial, dan Tata Kelola (Environmental, Social, and Governance atau ESG). Amerika Serikat dan Inggris tetap menjadi kontributor utama, meskipun aktivitas penelitian menjadi semakin terdesentralisasi dengan pertumbuhan pesat di Tiongkok, Iran, dan India. Dengan menyajikan sintesis berkelanjutan selama 25 tahun, studi ini menunjukkan bagaimana BSC telah dikonfigurasi ulang sebagai respons terhadap tuntutan keberlanjutan dan orientasi Industri 5.0 yang berpusat pada manusia. Temuan penelitian menunjukkan bahwa BSC tetap menjadi instrumen strategis yang relevan untuk menyelaraskan tujuan ekonomi, sosial, dan lingkungan, terutama ketika diterapkan dalam arsitektur manajemen yang terintegrasi dengan ESG.

1. INTRODUCTION

Between 2000 and 2025, strategic management systems underwent a fundamental transformation, reflected in the evolution of the Balanced Scorecard (BSC) from a conventional performance measurement tool into an integrated, forward-looking, and multidimensional framework. This transition began with the use of strategy maps to visualize causal relationships and systematically translate intangible assets into measurable organizational outcomes. More recently, integrating Triple Bottom Line (TBL) principles and Environmental, Social, and Governance (ESG) criteria into the BSC architecture has become essential for supporting long-term organizational sustainability (Dwivedi et al., 2021; Lim & Ok, 2021). This transformation incorporates economic, social, and environmental dimensions into a comprehensive strategic management system. Through this reconfiguration, organizations can better align financial performance with ecological stewardship and social responsibility amid the evolving dynamics of Industry 5.0 (Dağıdır & Ozkan, 2024; Elbanna et al., 2022). Integrating sustainability-related variables into the strategic framework is therefore critical to strengthening organizational resilience across multiple dimensions. The growing use of nonfinancial indicators further demonstrates the BSC's evolution beyond a narrow performance measurement tool toward a framework responsive to contemporary global challenges. Accordingly, these dimensions should no longer be viewed as supplementary considerations; rather, they constitute fundamental elements of modern managerial systems (da Silva Neiva et al., 2021; Quezada et al., 2022).

The contemporary context also reflects a shift toward the values of Industry 5.0, which emphasize human-centricity, workforce well-being, gender inclusion, and systemic resilience as core foundations of future organizational competitiveness. Advanced technologies, including business intelligence systems and digital dashboard platforms, further expand the BSC's capacity to support high-precision performance monitoring and real-time decision-making in an uncertain global environment. The widespread adoption of the BSC across diverse sectors has produced a complex and dynamic body of literature, creating a need for comprehensive analytical approaches that extend beyond conventional review methods (Fedushko et al., 2021; Hegazy et al., 2022). In this context, bibliometric analysis provides an appropriate method for transforming publication data into an objective and structured map of a field's intellectual landscape. This approach facilitates the identification of research trends, influential contributors, thematic developments, and global collaboration patterns. It also helps clarify the trajectory of research productivity and identify key stages in the adoption and adaptation of the BSC as a strategic management system. Accordingly, this study develops a structured, data-driven framework to examine the complexity and evolution of BSC scholarship (Al-Mawali, 2023; KhanMohammadi et al., 2024).

Although several bibliometric and systematic reviews have examined BSC scholarship (e.g., Kumar et al., 2022; Yawson & Paros, 2023; de Jesus Alvares Mendes Junior & Alves, 2023), previous studies have generally focused on a single sector, covered shorter time horizons, and/or preceded the consolidation of ESG and Industry 5.0 discourse. Consequently, the literature lacks a continuous bibliometric mapping of the 2000–2025 period that explicitly traces how the BSC has been reconfigured in response to TBL, ESG, and the human-centric imperatives of Industry 5.0. This study addresses this gap through three contributions. First, it compiles a 25-year longitudinal dataset encompassing the pre-sustainability, sustainability-integration, and Industry 5.0 phases of BSC development. Second, it links changes in the field's intellectual structure to these broader paradigm shifts. Third, it provides an evidence base for identifying emerging research priorities. To guide the analysis, this study addresses the following research questions:

- RQ1: What publication trends characterize the development of the BSC as a strategic management system?
- RQ2: Which authors, countries, and institutions have been the most productive contributors to BSC research?
- RQ3: What are the characteristics of collaboration networks among authors and countries in BSC research?
- RQ4: How have the major themes in BSC research evolved over time?
- RQ5: Which articles have exerted the greatest influence on the BSC literature, based on citation counts during the 2000–2025 period?
- RQ6: Which journals have served as the primary publication outlets for BSC research and demonstrated the strongest publication growth?
- RQ7: Which keywords are most frequently used by authors to represent the principal research foci within the BSC domain?

2. CONCEPTUAL BACKGROUND

This study is framed through the lenses of dynamic capabilities and stakeholder theory, positioning the BSC

as an evolving managerial capability that has progressively integrated a broader array of stakeholders—shifting focus from "customers" to employees, communities, and ecological interests. This theoretical perspective helps explain why the BSC has been continually reconfigured rather than replaced as global strategic priorities have shifted toward sustainability and human-centricity.

Since its inception in 1992, the BSC has undergone a fundamental transformation from a retrospective performance measurement tool into a comprehensive strategic management system (SMS) that integrates prospective, holistic, and multidimensional perspectives. A critical turning point occurred in the early 2000s with the introduction of strategy maps. By visualizing cause-and-effect relationships between different perspectives, these maps enabled organizations to translate intangible assets into concrete, measurable results in a coordinated and transparent manner. Amid the current emphasis on sustainability, the BSC architecture has further integrated TBL principles, giving rise to the Sustainability Balanced Scorecard (SBSC) (Aria & Cuccurullo, 2017; Shah et al., 2019). Current management dynamics indicate a paradigm shift toward Industry 5.0 values, which prioritize a human-centric orientation, sustainability, and systemic resilience as the primary foundations of competitive advantage. This reorientation is reflected in the expansion of the "customer" perspective to a broader "stakeholder" view, encompassing managers, the workforce, and local communities. Evolution in the framework's design also incorporates specific elements for gender equality and women's empowerment (SDG 5), where traditional architectures are adapted to highlight inclusive strategic competencies (Aria & Cuccurullo, 2017; Shah et al., 2019).

Methodologically, the implementation of multi-criteria decision-making (MCDM) techniques—including AHP, ANP, TOPSIS, and DEMATEL variants—combined with fuzzy logic significantly enhances the accuracy of strategic assessments. This approach effectively mitigates obstacles arising from ambiguity and complexity within contemporary corporate ecosystems. The application of the BSC demonstrates effectiveness in the higher education sector (HEI), where bibliometric evidence reveals a strengthening trend in university governance aligned with the global sustainable development agenda. In the public sector and local government, organizations are integrating ESG indicators into the BSC framework to enhance democratic accountability, operational transparency, and the quality of public services. In manufacturing and the small and medium-sized enterprise (SME) sector, the BSC serves as a transformative tool for the circular economy by prioritizing energy efficiency, waste management, and eco-friendly design. Furthermore, the integration of Agile principles and transportation safety frameworks enables the BSC to respond dynamically to operational volatility. Contemporary technological infrastructures—including Business Intelligence (BI), interactive dashboards, and text-mining—facilitate real-time data visualization and automated performance tracking with high accuracy.

Some scholars even advocate for a BSC ontology as a semantic layer to bridge the gap between business strategy and IT data infrastructure. In the context of family businesses, the BSC helps maintain financial stability and preserve cultural heritage across generations through disciplined cash flow management. Additionally, military practices have contributed insights to corporate strategy regarding decentralized decision-making and holistic risk management (Gomes et al., 2021; Hristov et al., 2024). Literature patterns indicate a transition from rigid hierarchical architectures toward more flexible semi-hierarchical models, where social and environmental targets are no longer subordinate to financial goals. Worker well-being is now a critical indicator within the "learning and growth" perspective to mitigate the risk of knowledge loss. Finally, the systematic integration of ESG ensures that organizations manage climate transition risks through operational decarbonization and green economy investments (Abueid et al., 2023; Michalski, 2024).

Ultimately, the evolution of the BSC represents a shift from a static tool to a resilient, adaptive system capable of creating sustainable value for the entire stakeholder ecosystem. Today, the BSC has transformed into an ontological framework that links strategic foresight with operational execution aligned with ethical principles and global sustainability imperatives (El-Garaihy, 2021; Martín-Gómez et al., 2024). As a descriptive bibliometric study, this research does not formulate or test causal hypotheses through regression or structural equation modeling. Instead, it is guided by the aforementioned research questions to structure a comprehensive science-mapping analysis.

3. RESEARCH METHOD

This study employs a descriptive quantitative research design using bibliometric analysis to systematically explore the evolution of the BSC as a strategic management framework. Bibliometric analysis was selected for its effectiveness in extracting and visualizing large-scale publication datasets, allowing for the creation of a comprehensive map of intellectual knowledge. This methodology enables the objective identification of

contemporary research dynamics and the structure of international scientific collaboration (Adel et al., 2024; Nazari-Ghanbarloo, 2022).

Table 1. Summary of search strategy

Search Strings	Data Source	Documents	Limited to
TITLE-ABS-KEY ("Balanced Scorecard" OR "BSC") AND TITLE-ABS-KEY ("Strategic Management" OR "Strategic Planning" OR "Strategy Map*" OR "Strategic Management System") AND PUBYEAR > 1999 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"cp") OR LIMIT-TO (DOCTYPE,"re")) AND (LIMIT-TO (LANGUAGE,"English"))	Scopus	1188	Subject not limited
TITLE-ABS-KEY ("Balanced Scorecard" OR "BSC") AND TITLE-ABS-KEY ("Strategic Management" OR "Strategic Planning" OR "Strategy Map*" OR "Strategic Management System") AND PUBYEAR > 1999 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (LANGUAGE , "English"))	Scopus	736	Subjects limited to business management and accounting, Social Sciences, and Decision Sciences
TITLE-ABS-KEY ("Balanced Scorecard" OR "BSC") AND TITLE-ABS-KEY ("Strategic Management" OR "Strategic Planning" OR "Strategy Map*" OR "Strategic Management System") AND PUBYEAR > 1999 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE,"re")) AND (LIMIT-TO (LANGUAGE,"English")) AND (LIMIT-TO (SUBJAREA,"BUSI") OR LIMIT-TO (SUBJAREA,"DECI") OR LIMIT-TO (SUBJAREA,"SOCI"))	Scopus	38	Document type limited to review papers

Source: compiled by the authors

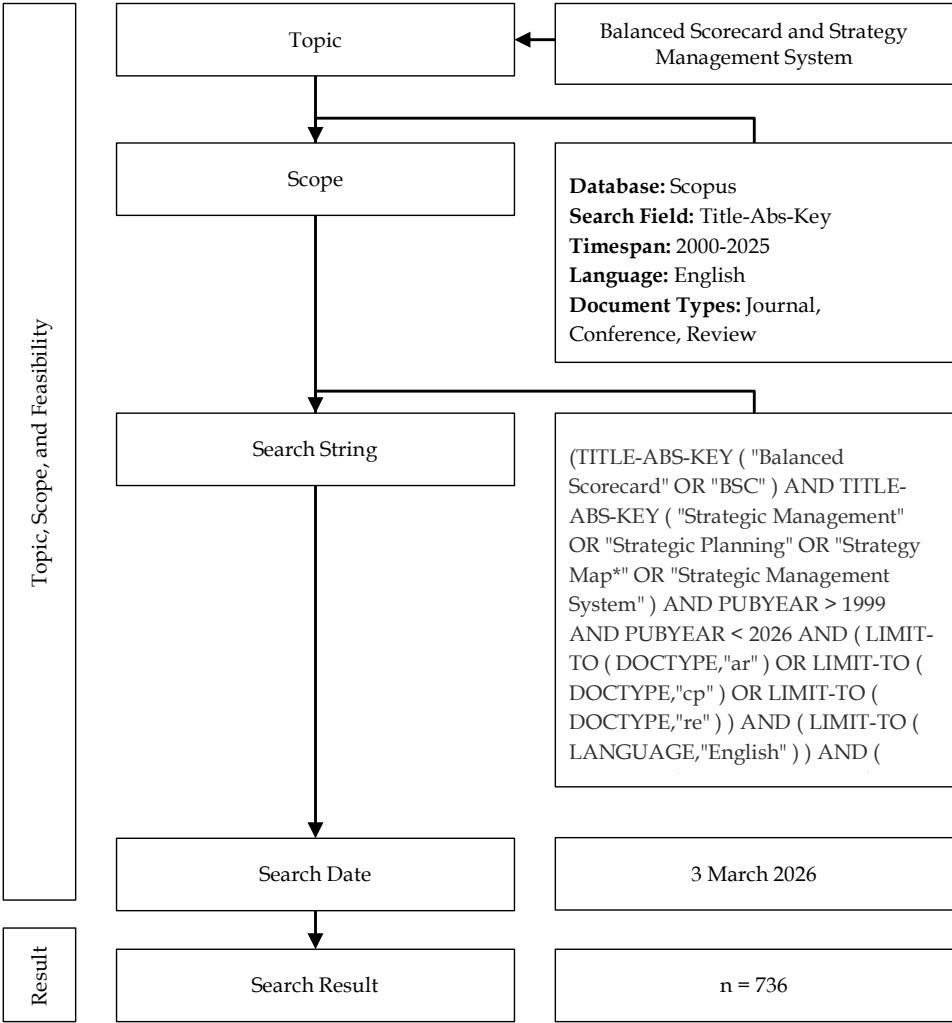
As detailed in Table 1, data were retrieved from the Scopus database using a systematic search protocol. The search strategy was designed to capture the evolution of BSC scholarship within the strategic management spectrum between 2000 and 2025. An initial search without subject restrictions identified 1,188 documents. To maintain substantive coherence and ensure the relevance of the literature, inclusion criteria were applied by limiting the search to specific subject areas. This step focused the analysis on the disciplines of Business, Management, and Accounting; Social Sciences; and Decision Sciences (Kumar et al., 2023; Tripathi & Roy, 2024). The 2000–2025 timeframe was chosen deliberately to encompass key milestones in the field. The year 2000 coincides with the expansion of the BSC into a strategic management system and the emergence of strategy maps. This 25-year window further covers the introduction of the Sustainability BSC (2002), the consolidation of ESG reporting, and the transition from Industry 4.0 to Industry 5.0, thereby capturing the full arc of the BSC's transformation.

Delimiting the subject areas to Business, Management, Decision Sciences, and Social Sciences filters out documents from fields such as engineering, medicine, and computer science, where the "BSC" acronym may carry unrelated meanings. This ensures thematic consistency across the dataset. Additionally, only English-language documents were retained to ensure terminological consistency for keyword co-occurrence analysis and thesaurus normalization, as English is the primary language of indexed strategic management scholarship. This language restriction is acknowledged as a study limitation in Section 5.

Finally, the study includes articles, conference papers, and reviews to capture both theoretical developments and empirical implementations. The resulting dataset of 736 documents provides a more representative overview of the field than a narrower subset of review-only papers (38 documents).

3.1 Data Collection

As exhibited in Figure 1, data were retrieved from the Scopus database using Boolean operators to ensure search precision and relevance. While the initial search yielded 1,188 documents, the dataset was refined through subject-area screening to a final sample of 736 documents (Asarian et al., 2025; Goldstein, 2022; Suárez-Gargallo & Zaragoza-Sáez, 2021; Waddock, 2025).



Source: compiled by the authors

Figure 1. Search strategy flowchart

3.2 Data Visualization

Following the filtration phase (see Figure 2), complete bibliographic information for all documents meeting the predefined criteria was exported in Comma-Separated Values (CSV) format to facilitate computational and network analysis. Data visualization is central to this study, as it transforms complex data matrices into accessible spatial knowledge maps. To achieve this, we utilized two primary analytical tools: VOSviewer and Biblioshiny. VOSviewer was employed to analyze co-authorship patterns and keyword co-occurrence, using clustering techniques to identify shifts in research themes. Biblioshiny provided dynamic visualizations of publication growth, the productivity trajectories of institutions and countries, and a detailed analysis of thematic evolution.



Source: compiled by the authors

Figure 2. Research methodology in developing bibliometric analysis

3.3 Data Analysis

Both Author and Index keywords served as the primary units of analysis for constructing co-occurrence networks, supplemented by data from titles, years, source titles, and abstracts. Citation data, DOIs, and cross-references were utilized to trace the structural evolution of the BSC discourse. To ensure data quality, we employed a thesaurus file to consolidate synonymous terms and exclude irrelevant entities, while occurrence thresholds were established to extract the most significant terminology. In the resulting network visualizations, node size represents the frequency of occurrence, while color clusters and link thickness indicate thematic proximity and the strength of conceptual correlations.

Biblioshiny and VOSviewer were selected for their complementary analytical capabilities. Biblioshiny, the web interface for the R-package bibliometrix (Aria & Cuccurullo, 2017), was used to generate performance metrics—such as productivity by author, country, institution, and source—while analyzing thematic and temporal evolution. VOSviewer was employed specifically for its optimization in constructing and visualizing co-authorship and keyword co-occurrence networks. Utilizing both tools enabled the integration of performance analysis and science mapping into a single, reproducible workflow.

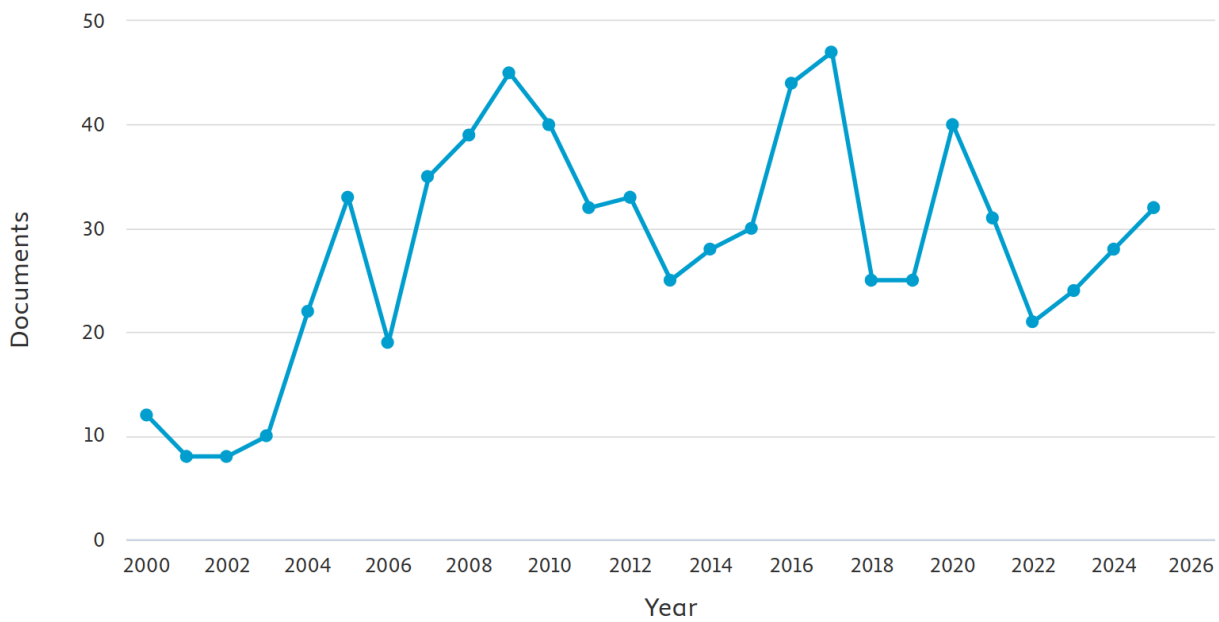
4. DATA ANALYSIS AND DISCUSSION

4.1. Descriptive Overview

Over the past quarter century, the BSC has evolved from a performance measurement instrument into a comprehensive SMS that incorporates sustainability dimensions and human-centric principles associated with Industry 5.0. The increasing decentralization of global research collaboration further reinforces the BSC's role as an adaptive framework for resilient, socially and ecologically oriented governance (Huynh et al., 2024; Piantoni et al., 2023).

4.2. BSC Publication Trend

The bibliometric trajectory indicates a fundamental evolution of the BSC from a primarily technocentric



Source: Scopus

Figure 3. BSC growth over 25 years

performance tool into a central framework in strategic management that increasingly incorporates Industry 5.0 and sustainability principles. As shown in Figure 3, BSC-related publications over the 25-year period reached a pronounced peak in 2017 and demonstrated renewed growth toward 2025. This recent increase is consistent with a broader shift from a technology-centered orientation toward a framework that supports human-centricity and sustainability.

These developments suggest that the BSC has evolved into a strategic management system capable of aligning digital efficiency with social resilience and intellectual capital (Piantoni et al., 2023; Ritter & Schanz, 2021; Terzi Coban & Uslu, 2025). This momentum reinforces the BSC's continuing relevance as a framework for managing technological complexity while supporting long-term value creation. The recent growth pattern further suggests that the BSC retains a central position in scholarship on sustainable organizational governance.

4.3. Leading Authors and Countries

Over the past twenty-five years, the resilience of the BSC has been accompanied by a significant decentralization of research. As shown in Table 2, this shift signals a move away from Western dominance toward a more inclusive global academic discourse (Abd-Elrahman et al., 2025; Gholami et al., 2025; Rai & Bera, 2025). The United States (90 documents) and the United Kingdom (65 documents) remain the leading contributors to global BSC scholarship and practice. The substantial contributions from Iran (39 documents), China (35 documents), and Germany (35 documents) further indicate strong regional interest in BSC research. Their prominence may also reflect the adoption of the BSC in manufacturing-intensive economies seeking to navigate increasing complexity in global markets (Krylov, 2025; Nie et al., 2025; Palaniappan & Suganthi, 2024; Sartzetaki et al., 2025).

Table 2. Number of affiliated articles

Country	Total Documents
United States	90
United Kingdom	65
Iran	39
China	35
Germany	35

Country	Total Documents
Australia	32
India	31
Brazil	29
Taiwan	26

Source: compiled by the authors

Table 3. Leading authors with the highest number of documents

Author	Number of Documents	Number of Citations
Kaplan, R.S.	9	2,552
Kettunen, J.	8	247
Gallo, P.	6	81
Norton, D.P.	6	2,152
Quezada, L.E.	6	194
Chan, Y.C.L.	6	269
Cokins, G.	4	31
Palominos, P.I.	4	158

Source: compiled by the authors

Table 4. Number of Affiliated Articles

Affiliation	Number of Documents
University of Tehran	12
Harvard Business School	9
Turun ammattikorkeakoulu	9
Universidad de Santiago de Chile	7
Iscte – Instituto Universitário de Lisboa	7
Leuphana Universität Lüneburg	7
K. N. Toosi University of Technology	6
National Chengchi University	6
Islamic Azad University	6

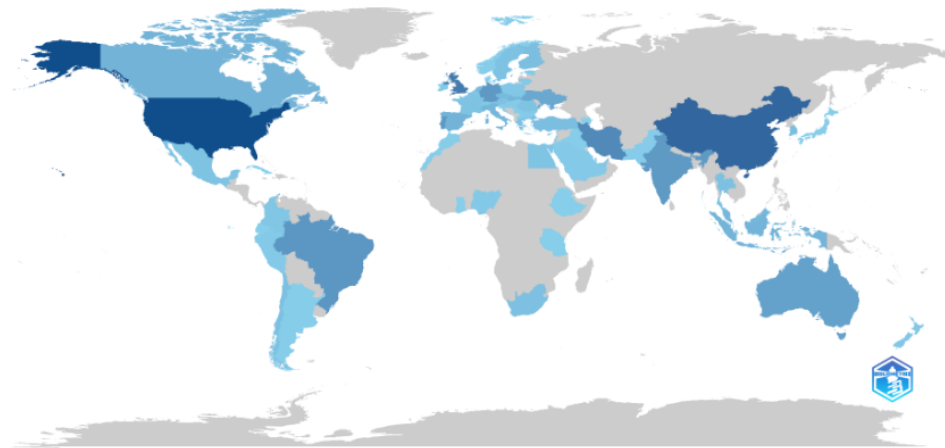
Source: compiled by the authors

As exhibited in Table 3, Robert S. Kaplan (9 documents; 2,552 citations) and David P. Norton (6 documents; 2,152 citations) are the most influential authors in the Balanced Scorecard (BSC) literature, with their work serving as foundational references for the field. J. Kettunen demonstrates high publication productivity (8 documents) but a distinct citation profile (247 citations), illustrating the different roles of foundational framework developers and scholars who broaden the scope of subsequent research. L. E. Quezada and Y. C. L. Chan, with six publications each, further demonstrate that the research network has expanded beyond its original central figures (Kang & Na, 2024; Malashenko & Gutman, 2025; Vracheva & Moussetis, 2025).

At the institutional level, the University of Tehran (12 documents) and Harvard Business School (9 documents) lead the field. This distribution indicates that while the Balanced Scorecard (BSC) is rooted in Western management theory, it has been widely adopted and refined by higher education institutions worldwide (Astuty et al., 2023; Hamied & Elbagoury, 2025; Mushtaha et al., 2024).

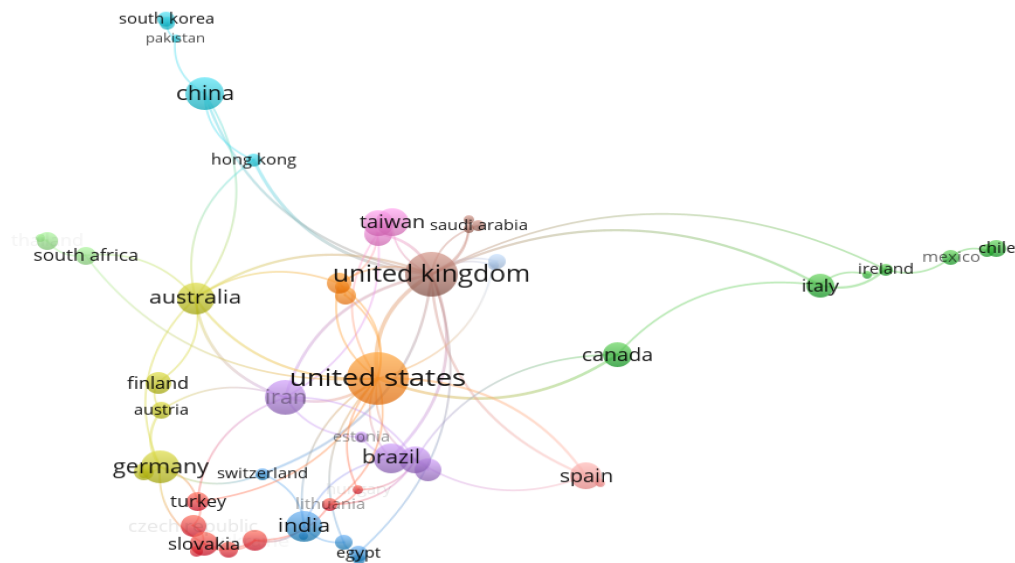
4.4. Global Collaboration Networks

The prominence of the United States and the United Kingdom is reflected in the central influence of Kaplan and Norton. At the same time, the growing dispersion of research across regions highlights the expansion of BSC scholarship worldwide. As illustrated in Figure 4, which presents scientific production by country, the United States and China emerge as leading contributors. This pattern reflects the maturity of the Balanced Scorecard (BSC) as a globally applicable strategic management system (SMS) (Damtoft et al., 2025; Höglund et al., 2021; Kumar et al., 2022; Oyewo et al., 2022).



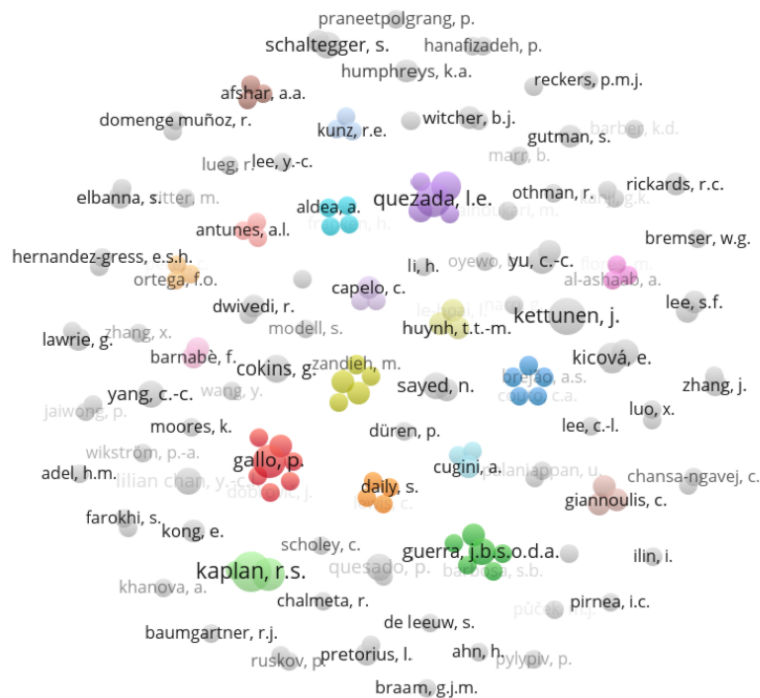
Source: Biblioshiny

Figure 4. Distribution of author collaboration



Source: VOSviewer

Figure 5. Visualization of cross-country collaboration networks



Source: VOSviewer

Figure 6. Visualization of Author Collaboration Networks

Figure 5 illustrates the evolution of Balanced Scorecard (BSC) research from its early concentration in the United States and the United Kingdom toward a more globalized and interdisciplinary research ecosystem. The expansion of research networks to China, India, and Brazil is consistent with the growing emphasis on Industry 5.0 values, including human-centricity, sustainability, and systemic resilience. This development also aligns with the principles of Integrated Reporting (Adel, 2021; de Jesus Alvares Mendes Junior & Alves, 2023; Quesado et al., 2022).

Figure 6 positions Robert S. Kaplan as the central intellectual anchor of BSC scholarship. Emerging clusters, including those associated with Quezada and Guerra, indicate a diversification of research that increasingly incorporates human-centricity and sustainability. This transition from concentrated intellectual leadership to more dispersed collaboration suggests that the BSC is developing into a resilient strategic platform supported by a hybrid and interdisciplinary research approach.

4.5. Evolution and General Themes

Over the past three decades, the BSC has evolved from a conventional performance measurement tool into a SMS that integrates sustainability dimensions and human-centric orientations. As detailed in Table 5, the framework originated in 1992, when Kaplan and Norton introduced a performance measurement model organized around four perspectives: financial, customer, internal business processes, and learning and growth. Early contributions by L. S. Maisel informed this development, which Kaplan and Norton subsequently refined in their 1993 Harvard Business Review article (León et al., 2022; Santarsiero, 2023; Vasconcelos et al., 2023).

Table 5. Historical development of the BSC

Year	Pivotal Events / Publications	Principal Figures / Authors
1992	The Balanced Scorecard: Measures That Drive Performance (Harvard Business Review Article)	Robert S. Kaplan and David P. Norton
1992	Performance Management: The Balanced Scorecard Approach (Article)	L. S. Maisel
1993	Putting the Balanced Scorecard to Work (Harvard Business Review Article)	Robert S. Kaplan and David P. Norton

Year	Pivotal Events / Publications	Principal Figures / Authors
	Article)	
1996	The Balanced Scorecard: Translating Strategy into Action (Book)	Robert S. Kaplan and David P. Norton
1996	Using the Balanced Scorecard as a Strategic Management System (Article)	Robert S. Kaplan and David P. Norton
2000	Sustainable Strategic Management Framework	Stead and Stead
2001	The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Competitive Environment (Book)	Robert S. Kaplan and David P. Norton
2002	Emergence of the Sustainability Balanced Scorecard (SBSC)	Figge et al. (Referenced as a post-2000 variation development)
2003	Strategy Maps (Book)	Robert S. Kaplan and David P. Norton
2004	Third-generation Balanced Scorecard: Evolution of an Effective Strategic Control Tool	G. Lawrie and I. Cobbold
2008	The Execution Premium: Linking Strategy to Operations for Competitive Advantage (Book)	Robert S. Kaplan and David P. Norton
2014-2025	Development of the Eco-social Balanced Scorecard and Human-centric Frameworks	Sandra Waddock (2025), Sergey Krylov (2025), Nie et al. (2025)

Source: compiled by the authors

4.6. Most Influential Articles

The most highly cited articles underscore the early integration of sustainability into business strategy during the 2000s (See Table 6). The 2002 article on the Sustainability Balanced Scorecard received the highest citation count (853), signaling a significant shift toward environmentally conscious governance. Studies on strategy maps (751 citations) and the strategic readiness of intangible assets (604 citations; 2004) were also highly influential, reflecting the field's growing emphasis on linking intangible resources, strategic implementation, and sustainable value creation (Antunes et al., 2024, 2025; Hugo et al., 2024).

Table 6. Most cited articles

Title	Source title	Year	Cited by
The sustainability balanced scorecard - Linking sustainability management to business strategy	Business Strategy and the Environment	2002	853.00
Having trouble with your strategy? Then map it.	Harvard business review	2000	751.00
Measuring the Strategic Readiness of Intangible Assets	Harvard Business Review	2004	604.00
A descriptive analysis on the implementation of Balanced Scorecards in German-speaking countries	Management Accounting Research	2003	387.00
The Sustainability Balanced Scorecard: A Systematic Review of Architectures	Journal of Business Ethics	2016	370.00
Designing a performance measurement system: A case study	European Journal of Operational Research	2004	347.00
Using the balanced scorecard as a strategic management system	Harvard Business Review	2007	295.00
Conceptual Foundations of the Balanced Scorecard	Handbooks of Management Accounting Research	2009	284.00
Performance measurement in construction	Journal of Management in Engineering	2004	282.00
Mastering the management system	Harvard Business Review	2008	270.00
Strategic performance management: A balanced approach to performance management issues in local government	Management Accounting Research	2000	262.00
The interplay of different levers of control: A case study of introducing a new performance measurement system	Management Accounting Research	2005	256.00
The dynamics of value creation: Mapping your intellectual performance drivers	Journal of Intellectual Capital	2004	251.00

Title	Source title	Year	Cited by
Beyond the balanced scorecard: Refining the search for organizational success measures	Long Range Planning	2003	233.00
The strategy map: guide to aligning intangible assets	Strategy & Leadership	2004	221.00
Sustainable supply chain management: A closed-loop network hierarchical approach	Industrial Management and Data Systems	2015	203.00
Applying the balanced scorecard concept: An experience report	Long Range Planning	2001	200.00
Development of a balanced scorecard: An integrated approach of Interpretive Structural Modeling (ISM) and Analytic Network Process (ANP)	International Journal of Productivity and Performance Management	2007	199.00
Constructing a strategy map for banking institutions with key performance indicators of the balanced scorecard	Evaluation and Program Planning	2012	185.00
The development of strategic management in the non-profit context: Intellectual capital in social service non-profit organizations	International Journal of Management Reviews	2008	182.00

Source: compiled by the authors

4.7. Primary Publication Journals

Table 7 identifies the International Journal of Productivity and Performance Management as the most prolific outlet (25 documents), followed by Sustainability (18 documents). These findings suggest that while the primary research focus remains the optimization of organizational performance, the diversity of publication venues underscores the multidisciplinary maturity of the field.

Table 7. Number of articles over 25 years

Journal	Documents
International Journal of Productivity and Performance Management	25.00
Sustainability Switzerland	18.00
IFIP Advances in Information and Communication Technology	9.00
Measuring Business Excellence	9.00
International Journal of Educational Management	8.00
Management Decision	8.00
Industrial Management and Data Systems	7.00
International Journal of Business Performance Management	7.00
Strategic Direction	7.00
Benchmarking	6.00
Long Range Planning	6.00
Total Quality Management and Business Excellence	6.00
Emerald Emerging Markets Case Studies	5.00
European Journal of Operational Research	5.00
International Journal of Business Excellence	5.00
International Journal of Production Economics	5.00
Journal of Accounting and Organizational Change	5.00
Journal of Cleaner Production	5.00
Journal of Intellectual Capital	5.00
Lecture Notes in Business Information Processing	5.00

Source: compiled by the authors

4.8. Keyword Trends and Primary Keywords

Burst-detection analysis, presented in Figure 7, indicates that research attention between approximately 2000

and 2005 focused primarily on quality management and basic performance measurement, as reflected in prominent terms such as total quality management and performance. This pattern corresponds to the late Industry 3.0 emphasis on standardization, process control, and quality improvement (Eftekhari & Torabi, 2022; Gutman et al., 2022; Lina et al., 2025).



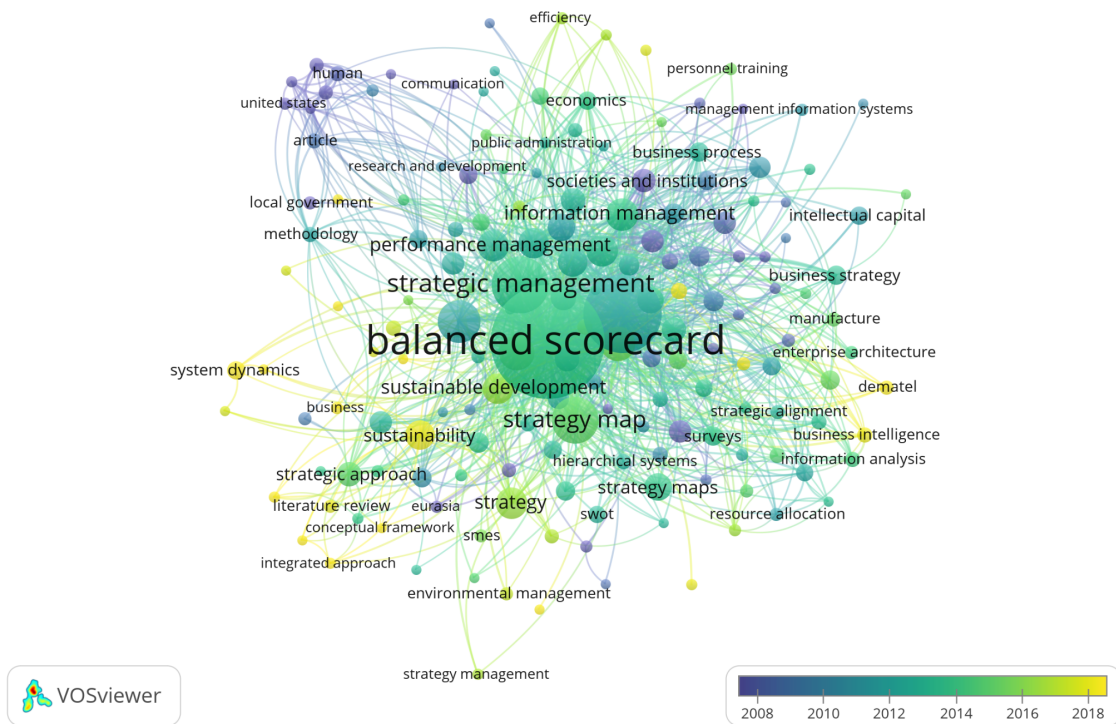
Source: Biblioshiny

Figure 7. Keyword Burst Detection

Analysis of topic novelty and the keyword network (see Figures 8 and 9) reveals a chronological shift from early research clusters toward themes of sustainability, environmental management, and sustainable development. More recently, intellectual capital and information analysis have emerged as significant research nodes. By adopting an integrated systems-dynamics approach, the BSC has evolved into an adaptive framework that aligns technological efficiency with broader social value creation (Garefalakis et al., 2025; Larsson et al., 2025; Rockett, 2025).

Technically, the integration of business intelligence and information management demonstrates the readiness of the BSC's digital infrastructure for data-driven decision-making. These bibliometric patterns are consistent with the BSC's continuous adaptation over the past quarter-century to meet contemporary demands for a balance between technological advancement and social sustainability (Alexakis et al., 2025; Altwajjri & Alhomedan, 2025; Vega et al., 2025).

It is important to emphasize that while bibliometric mapping reveals patterns in publication, citation, and co-occurrence—documenting how the field is structured and where scholarly attention has shifted—it does not, in itself, prove that the BSC has become more ethical or sustainable in practical application.



Source: VOSviewer

Figure 8. Topic novelty

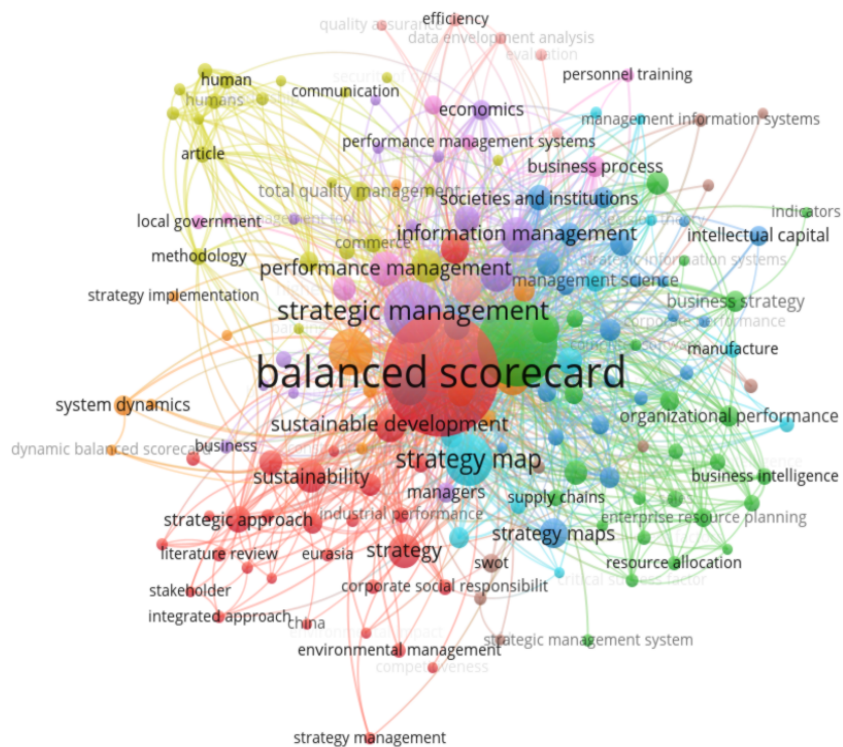


Figure 9. Keyword network visualization

5. DISCUSSION AND CONCLUSION

Over the past quarter century, the BSC has evolved from a static performance measurement instrument into an integrative and resilient SMS. Based on an analysis of 736 documents published between 2000 and 2025, research productivity peaked in 2017 and showed renewed growth as scholarship increasingly engaged with the Industry 5.0 agenda (Alrawashdeh et al., 2024; Huynh et al., 2021; Vega et al., 2025).

The field has also become substantially more decentralized. Although the United States and the United Kingdom remain influential, Iran, China, and Germany have made increasingly significant contributions to BSC scholarship (Alnoukari, 2021; Kashchena et al., 2023; Oyewo et al., 2021). Thematically, research has shifted from a primary emphasis on technology-driven efficiency toward systemic resilience, particularly through the integration of ESG considerations. Early Sustainability Balanced Scorecard (SBSC) publications continue to serve as foundational references within this evolving body of work.

Compared with earlier bibliometric and systematic reviews of BSC scholarship, which typically focused on specific sectors or shorter time periods, this study provides a 25-year synthesis of the field. Its principal theoretical contribution lies in situating changes in the intellectual and thematic structure of BSC research within the broader transition toward ESG integration and Industry 5.0.

The maturity of the BSC is further reflected in its application across higher education institutions, public-sector organizations, and manufacturing firms. Within this broader evolution, employee well-being has become an increasingly important indicator in the learning and growth perspective, particularly because it may help reduce the risk of strategic knowledge loss associated with employee dissatisfaction and turnover.

For managers, the findings suggest that BSC architectures should incorporate ESG and TBL indicators. Such integration can enable strategy maps to link financial objectives with decarbonization, employee well-being, and stakeholder outcomes. For public-sector and local-government managers, ESG-integrated scorecards may strengthen service transparency and public accountability. For higher education administrators, the BSC can support the alignment of institutional governance with sustainable development objectives. For researchers, the emerging clusters identified in this study—including ESG, sustainability, intellectual capital, and business intelligence—represent important directions for future research.

This study has several limitations. First, the dataset was drawn exclusively from Scopus; relevant studies indexed only in Web of Science, Dimensions, or regional databases may therefore be omitted. Second, the analysis was limited to English-language documents, which may underrepresent scholarship published in non-English-speaking regions. Third, the dataset included only articles, conference papers, and review articles, excluding books and book chapters that may contain influential BSC contributions. Finally, bibliometric methods describe patterns of publication, citation, and conceptual association. They map the structure and evolution of a field but cannot independently establish the substantive validity of the conceptual claims advanced in the literature.

In conclusion, the evidence from the past three decades reinforces the BSC's position as a central framework in strategic management. Its continued evolution suggests that it can address the ethical, social, technological, and environmental demands facing contemporary organizations. The modern BSC increasingly integrates intellectual capital and ecosystem sustainability alongside financial performance. Although bibliometric evidence cannot verify its practical effectiveness, the observed publication, citation, and thematic patterns are consistent with the BSC's continuing adaptability and relevance for managing disruption while balancing economic prosperity with long-term social welfare.

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