

The State Of Sustainable Competitive Advantage Research And Future Directions

Kondisi Penelitian Keunggulan Kompetitif Berkelanjutan Dan Arah Masa Depan

Toetik Wulyatiningsih¹, Deske W. Mandagi^{2*}

Faculty of Economics and Business, Universitas Klabat, Manado, Indonesia^{1,2}

toetikmatindas@unklab.ac.id¹, deskemandagi@unklab.ac.id²

**Corresponding Author*

ABSTRACT

The growing importance of long-term competitiveness has intensified scholarly interest in sustainable competitive advantage (SCA). However, existing studies remain fragmented across strategic management, innovation, sustainability, and information systems research. This study conducts a systematic literature review supported by bibliometric and keyword co-occurrence analyses using the PRISMA framework to map the intellectual structure of SCA research. An initial search of the Scopus database identified 812 publications, which were screened and reduced to 136 articles for final analysis. The findings reveal six major thematic clusters: sustainability and stakeholder value, strategic management and organizational performance, innovation and technological capabilities, dynamic capabilities and organizational learning, industrial and manufacturing applications, and data driven and knowledge-based systems. The results indicate that sustainability strategies, managerial capabilities, innovation practices, operational systems, and digital technologies collectively shape the development of SCA. This study contributes by integrating fragmented insights and clarifying the main research streams in SCA literature. It also highlights emerging themes such as digital transformation and sustainability integration, offering directions for future Interdisciplinary Research On Sustainable Competitiveness.

Keywords: Sustainable Competitive Advantage; Bibliometric Analysis; Prisma; Digital Transformation; Sustainability Strategy.

ABSTRAK

Meningkatnya pentingnya daya saing jangka panjang telah mengintensifkan minat akademis pada keunggulan kompetitif berkelanjutan (SCA). Namun, studi yang ada masih terfragmentasi di berbagai bidang manajemen strategis, inovasi, keberlanjutan, dan penelitian sistem informasi. Studi ini melakukan tinjauan literatur sistematis yang didukung oleh analisis bibliometrik dan ko-okurensi kata kunci menggunakan kerangka kerja PRISMA untuk memetakan struktur intelektual penelitian SCA. Pencarian awal di basis data Scopus mengidentifikasi 812 publikasi, yang kemudian disaring dan dikurangi menjadi 136 artikel untuk analisis akhir. Temuan menunjukkan enam kluster tematik utama: keberlanjutan dan nilai pemangku kepentingan, manajemen strategis dan kinerja organisasi, inovasi dan kemampuan teknologi, kemampuan dinamis dan pembelajaran organisasi, aplikasi industri dan manufaktur, serta sistem berbasis data dan pengetahuan. Hasil menunjukkan bahwa strategi keberlanjutan, kemampuan manajerial, praktik inovasi, sistem operasional, dan teknologi digital secara kolektif membentuk pengembangan SCA. Studi ini berkontribusi dengan mengintegrasikan wawasan yang terfragmentasi dan mengklarifikasi aliran penelitian utama dalam literatur SCA. Studi ini juga menyoroti tema-tema yang muncul seperti transformasi digital dan integrasi keberlanjutan, menawarkan arahan untuk penelitian interdisipliner di masa depan tentang daya saing berkelanjutan.

Kata Kunci: Keunggulan Kompetitif Berkelanjutan; Analisis Bibliometrik; Prisma; Transformasi Digital; Strategi Keberlanjutan.

1. Introduction

In highly competitive and rapidly changing markets, organizations continually seek strategies that enable them to outperform competitors over extended periods. This enduring superiority is commonly conceptualized as SCA, a central concept in strategic management that explains why some firms consistently achieve superior performance. The theoretical foundation of SCA is largely rooted in the Resource-Based View (RBV), which suggests that firms can achieve sustained performance when they possess valuable, rare, inimitable, and non-substitutable resources. Early strategic management research emphasized the role of firm-specific knowledge, capabilities, and governance mechanisms in enabling organizations to transform internal resources into long-term competitive advantages. For instance, firm-specific knowledge resources and human capital investments have been shown to play a critical role in generating competitive advantages that are difficult for competitors to replicate (Wang et al., 2009).

Over time, the theoretical understanding of SCA has expanded beyond the RBV to incorporate complementary perspectives such as the Dynamic Capabilities Framework and the Knowledge-Based View. These perspectives emphasize that sustainable advantage depends not only on resource ownership but also on a firm's ability to integrate, reconfigure, and renew resources in response to environmental changes. For example, supplier integration capabilities and supply chain coordination have been shown to function as dynamic capabilities that enable organizations to adapt to changing market conditions while maintaining operational efficiency (Vanpoucke et al., 2014). Similarly, the development of supply chain network resources and practices has been conceptualized as a strategic mechanism through which firms build competitive performance in complex networked environments (Jin & Edmunds, 2015).

A substantial body of empirical research has examined organizational capabilities and strategic practices that contribute to SCA. Innovation capability is frequently identified as a key driver of long-term competitiveness. Research demonstrates that project management practices, product innovation, and process innovation can significantly enhance firms' ability to sustain competitive advantage in uncertain environments (Severo et al., 2020). Innovation strategies also influence organizational performance by improving productivity, reducing operational costs, and increasing customer value (Lim et al., 2010). Furthermore, knowledge management and organizational learning have been recognized as essential mechanisms through which firms convert innovation activities into sustained competitive outcomes (Zhang et al., 2023).

Another stream of research highlights the importance of managerial and operational capabilities in sustaining competitive advantage. Business process management has been conceptualized as a dynamic capability that enables organizations to coordinate complex activities and enhance organizational performance (Nadarajah & Kadir, 2014). Similarly, information management capability plays a crucial role in linking technological resources with organizational flexibility and agility, which in turn supports sustainable competitiveness (Maçada et al., 2020). Studies have also demonstrated that human capital development and employee performance significantly contribute to SCA by improving productivity, efficiency, and organizational learning (Chantabutr & Wanarat, 2024). These findings indicate that SCA emerges from the interaction of multiple organizational resources and capabilities rather than from a single strategic factor.

In recent years, sustainability-oriented strategies have become increasingly important in the pursuit of competitive advantage. Environmental pressures, regulatory requirements, and stakeholder expectations have encouraged firms to adopt environmentally responsible

strategies that simultaneously enhance competitiveness. For example, green innovation strategies allow firms to integrate and reconfigure resources toward environmentally sustainable production processes, which can strengthen competitive advantage across different industries (Gao et al., 2021). Eco-innovation practices such as eco-process and eco-organizational innovations have also been found to improve SCA in manufacturing firms (Mady et al., 2022). Similarly, cleaner production initiatives and environmentally oriented strategies contribute to competitive advantage by reducing environmental impacts while improving operational performance (de Guimarães et al., 2018).

In addition to environmental sustainability, digital transformation has emerged as another critical driver of SCA. Rapid advancements in digital technologies, including big data analytics, artificial intelligence, and digital platforms, have transformed the way organizations create and sustain competitive advantages. Research indicates that digital leadership and data-driven decision-making enhance organizational creativity and long-term competitiveness by enabling firms to utilize technological and organizational resources more effectively (Wang et al., 2025). Big data analytics capabilities also strengthen knowledge processes and operational engagement, which contribute to SCA (Aburayya, 2025; Aman et al., 2024). The integration of digital technologies with strategic management practices therefore represents an increasingly important pathway toward sustained competitiveness in modern organizations (Shah, 2022; Wulyatiningsih et al., 2026).

Despite the rapid growth of this body of research, the literature on SCA remains fragmented and theoretically dispersed. Many studies focus on specific antecedents such as innovation capability, digital transformation, environmental strategy, or human capital without integrating these perspectives into a coherent theoretical framework. For example, research on eco-innovation emphasizes environmental capabilities as key drivers of competitive advantage (Mady et al., 2023), while studies on digital transformation focus primarily on technological capabilities and digital leadership (Wang et al., 2025). Similarly, supply chain research highlights the importance of integration and resilience capabilities for sustaining competitiveness (Junaid et al., 2023), whereas entrepreneurship studies emphasize entrepreneurial competencies and innovation enablers as critical determinants of competitive advantage (Tehseen et al., 2024). Although these studies contribute valuable insights, they often remain confined within specific disciplinary perspectives.

As a result, an important research gap exists. The current literature provides extensive evidence regarding the determinants of SCA, yet there is limited synthesis of how these diverse theoretical perspectives collectively shape the development of the field. The rapid emergence of new research themes, including sustainability, digital transformation, artificial intelligence, and advanced analytics, has further increased the complexity of the intellectual landscape. Without a systematic integration of these research streams, it becomes difficult to understand the evolution of SCA research and to identify the theoretical directions that may guide future studies.

To address this gap, the present study examines the state of SCA and future directions. The study systematically synthesizes the existing literature to identify the dominant theoretical foundations, major research themes, and emerging trends that characterize contemporary research on SCA. Particular attention is given to the roles of strategic resources, organizational capabilities, sustainability strategies, and digital transformation in shaping the evolution of competitive advantage research.

The original contribution of this study lies in its integrative theoretical perspective. First, the study advances existing knowledge by synthesizing fragmented research streams into a coherent framework that clarifies the theoretical foundations and thematic evolution of SCA research. Second, the study identifies emerging research directions related to digital transformation, artificial intelligence, sustainability-oriented strategies, and organizational capabilities. These directions represent important opportunities for advancing strategic management theory. Third, by mapping the intellectual structure of the field, the study provides a clearer understanding of how different theoretical models contribute to the development of SCA research.

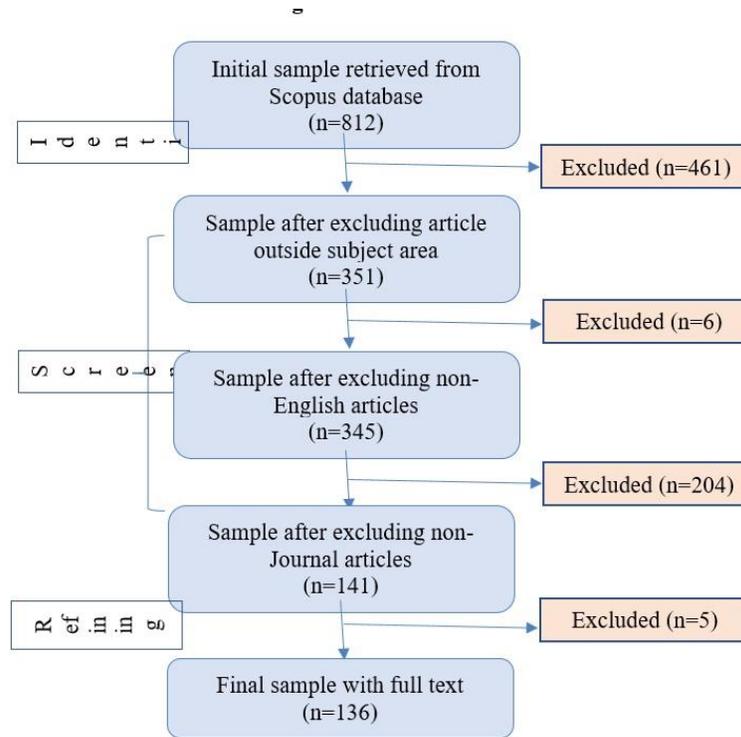
Beyond its theoretical contribution, this study also offers important implications for research and practice. For researchers, the findings provide a structured overview of the intellectual development of SCA and highlight promising avenues for future studies. For practitioners and policymakers, the study offers insights into the strategic capabilities, technological resources, and sustainability practices that organizations can leverage to maintain long-term competitiveness in complex and rapidly evolving business environments. By integrating diverse research streams and identifying future research directions, this study contributes to advancing both theoretical knowledge and practical understanding of SCA.

2. Methodology

2.1. Keyword Development and Search Strategy

Through an iterative consultation process, a final keyword configuration was established. The systematic search was conducted using the Scopus database, which is widely recognized for its extensive coverage of peer-reviewed academic publications. The search was limited to title, abstract, and keyword fields to ensure that retrieved studies explicitly addressed the core concepts of SCA. The Boolean search query applied in the database was: TITLE-ABS-KEY (sustainable AND competitive AND advantage). The search was restricted to publications within the Business, Management and Accounting subject area to ensure relevance to strategic management and organizational research.

Figure 1. Article Selection Process



2.2 Article Selection Process

Following the search procedure, the article selection process was conducted using the four stages of the PRISMA. The complete process is illustrated in Figure 1. During the identification stage, the initial search produced 812 documents from the Scopus database. In the screening stage, subject area filters were applied to retain only publications related to Business, Management, and Accounting. As a result, 461 articles were excluded, leaving 351 articles for further evaluation.

Next, language filtering was applied to ensure linguistic consistency. Six non-English articles were excluded, resulting in 345 articles. Subsequently, publication-type filtering was conducted to retain only peer-reviewed journal articles. A total of 204 non-journal publications, including conference proceedings, book chapters, and other non-peer-reviewed sources, were removed. This step resulted in 141 journal articles. During the eligibility stage, the full text of each article was assessed. Five articles were excluded due to the unavailability of their full-text versions. After completing this stage, 136 articles remained. Finally, these 136 articles were retained as the final dataset for the systematic review and subsequent analysis.

Table 1. Research Protocol

Research Protocol	Description
Document type	Scientific articles from Journal
Source	Scopus Database
Time frame	1988-2025
Search field	Title, abstract & keywords
Language	English

Search terms	TITLE-ABS-KEY (sustainable AND competitive AND advantage)
Subject area	Business, Management and Accounting
Inclusion criteria	Articles focus on Articles focusing on sustainable competitive advantage and related strategic management concepts Studies originating from non-peerreviewed books, book chapters, conference papers, practical reports, theses/ dissertations, working papers and predatory journals, non-English articles and articles without full text.
Exclusion criteria	

2.3 Research Protocol

To ensure transparency and replicability, the systematic review followed a clearly defined research protocol summarized in Table 1. The protocol specifies the data source, search parameters, inclusion and exclusion criteria, and other methodological decisions that guided the review process. The study focuses exclusively on peer-reviewed journal articles indexed in Scopus published between 1988 and 2025. Non-academic publications such as conference papers, book chapters, dissertations, and working papers were excluded to maintain the reliability and academic rigor of the dataset. Articles that were not written in English or lacked accessible full text were also excluded.

Through the systematic application of these criteria, the study ensured that the final dataset consisted of high-quality and relevant literature capable of supporting a comprehensive analysis of research trends and theoretical developments in the field.

2.4 Data Analysis

To analyze the selected literature, this study employed a multi-method analytical approach combining bibliometric analysis and qualitative content examination within the context of SCA. First, bibliometric analysis was conducted using the VOSviewer software. This technique enabled the visualization of relationships among publications through co-authorship networks, keyword co-occurrence patterns, and citation linkages. The bibliometric mapping provides insights into the intellectual structure of the research field, including influential authors, dominant themes, and the evolution of key research topics related to sustainable competitive advantage, strategic resources, and long-term organizational performance.

Second, a content analysis was conducted to interpret the conceptual and theoretical developments identified in the bibliometric results. This step involved examining how various organizational resources, strategic capabilities, sustainability practices, and stakeholder-oriented strategies contribute to the development of sustainable competitive advantage across the selected literature. By integrating bibliometric mapping with qualitative interpretation, this study provides a comprehensive understanding of the intellectual landscape, research trajectories, and emerging research opportunities related to sustainable competitive advantage.

3. Results and Discussions

3.1. Publication Profile SCA

The figure presents the annual distribution of publications on SCA from 1988 to 2024. Overall, the trend demonstrates a gradual evolution of scholarly interest, characterized by an early period of minimal activity followed by a substantial increase in research output in more recent years. During the initial phase (1988–2006), the number of publications remained extremely limited. Most years recorded no publications, with only occasional contributions appearing sporadically. This pattern indicates that research explicitly addressing SCA had not yet developed as a distinct area of inquiry. At this stage, discussions of competitive advantage were likely embedded within broader strategic management literature rather than examined as a dedicated research topic.

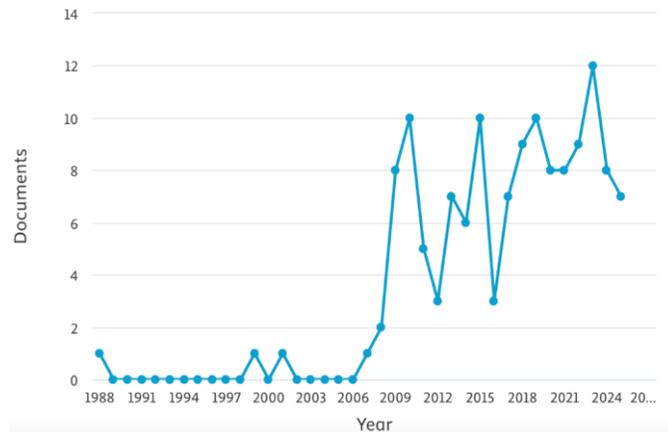


Figure 2. Annual trends in publications for SCA research

A noticeable shift began to emerge in the late 2000s (2007–2011). Starting in 2007, the number of publications began to increase gradually, rising from one or two articles to a sharp increase by 2010 and 2011, where annual publications reached approximately eight to ten documents. This surge suggests a growing academic recognition of the importance of SCA, particularly in response to increasing global competition and the growing emphasis on long-term organizational performance and strategic sustainability.

From 2012 onward, the field entered a stage of consistent scholarly engagement. Although the number of publications fluctuated between approximately three and ten articles per year, the overall level of research activity remained substantially higher than in earlier periods. Several peaks are visible during this period, including around 2016 and again in the early 2020s, reflecting renewed interest in the topic as firms increasingly face dynamic and complex competitive environments. The highest publication output occurs around 2023, reaching approximately twelve documents, indicating the strongest scholarly attention to the topic within the observed timeframe.

3.2. Citation Trend in SCA Research

Figure 3 illustrates the annual publication output and citation trend in SCA research from 2001 to 2025. The bars represent the number of documents published each year, while the line graph indicates the number of citations accumulated over time. Together, these indicators provide insight into both the productivity and scholarly impact of research in this field.

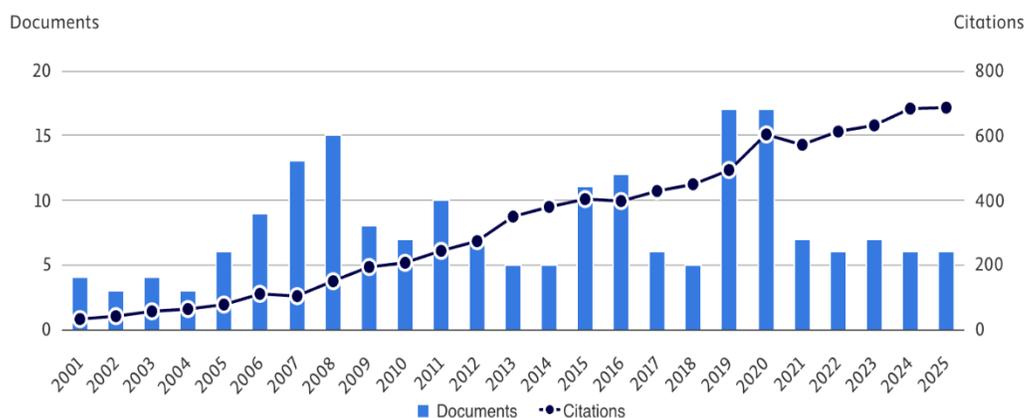


Figure 3. Publication Trend and Number of Citations

In the early period (2001–2005), the number of publications remained relatively low, ranging between approximately three and six documents per year. Citation counts during this stage were also minimal, reflecting the limited volume of published work and the early development of the research domain. However, the gradual rise in citations during these years suggests that the foundational studies published at the time began to attract attention within the academic community.

A significant increase in publication output can be observed between 2006 and 2008, when the number of documents rose sharply, reaching approximately 15 publications in 2008, which represents one of the earliest peaks in research productivity. Despite some fluctuations in the following years, publication activity remained relatively active throughout 2009–2016, generally ranging from about five to twelve articles annually. During this period, the citation trend demonstrates a steady upward trajectory, indicating that earlier publications were increasingly referenced by subsequent studies.

From 2017 onward, the field demonstrates continued scholarly engagement with moderate fluctuations in annual publications. Notably, a second major peak in productivity occurs in 2019 and 2020, where the number of publications rises to approximately 17 documents, representing the highest output within the observed period. Although the number of publications declines slightly after 2020, it remains relatively stable, averaging around six to seven articles per year.

In contrast to the fluctuations in publication output, the citation trend shows a consistent and substantial upward growth across the entire period. Citations increase steadily from fewer than one hundred in the early 2000s to approximately 650–700 citations by 2024–2025. This continuous rise suggests that the body of literature on SCA has progressively gained academic recognition and influence. Even during years when the number of publications declined, citation counts continued to increase, reflecting the enduring relevance and cumulative impact of previously published studies.

3.3. Most influential journals

Table 4 presents the top ten journals that have published the highest number of articles related to SCA, highlighting the main academic outlets contributing to the development of this research area. Among these journals, the Journal of Cleaner Production ranks first, indicating

the strong connection between sustainability-oriented research and the concept of SCA. Other highly ranked journals, such as the International Journal of Production Economics and the Strategic Management Journal, reflect the importance of both operational efficiency and strategic management perspectives in understanding how organizations achieve and maintain long-term competitive advantage.

The presence of journals such as International Journal of Production Research, Technological Forecasting and Social Change, Technovation, and Journal of Product Innovation Management further suggests that innovation, technology management, and forecasting play a significant role in shaping the SCA research landscape. Additionally, journals focusing on engineering and operations management, including IEEE Transactions on Engineering Management, Production Planning and Control, and Journal of Manufacturing Technology Management, demonstrate the interdisciplinary nature of the field. Overall, the distribution of journals indicates that research on SCA spans multiple disciplines, including strategic management, operations, innovation, and sustainability studies.

Table 4. Most influential journals by number of articles published (Top 10)

Rank	Journal Title	Counts	Publisher
1	Journal of Cleaner Production	11	Elsevier Ltd
2	International Journal of Production Economics	8	Elsevier
3	Strategic Management Journal	8	John Wiley & Sons
4	International Journal of Production Research	6	Taylor & Francis
5	Technological Forecasting and Social Change	6	Elsevier
6	IEEE Transactions on Engineering Management	5	IEEE
7	Journal of Product Innovation Management	5	Blackwell Publishing
8	Technovation	5	Elsevier
9	Production Planning and Control	4	Taylor & Francis
10	Journal of Manufacturing Technology Management	4	Emerald Publishing

3.4. Most influential Authors

Figure 4 presents the top ten most influential authors based on the number of articles published in the field of SCA. The distribution indicates that a relatively small group of scholars contributes repeatedly to the development of this research area. Among the authors, Liu, Y. ranks first with the highest number of publications, contributing five articles. This indicates a strong and consistent involvement in advancing research on SCA. Following Liu, García-Muiña, F.E., Navas-López, J.E., and Zhang, Y. each contributed three publications, suggesting their notable role in shaping the literature and expanding the theoretical and empirical understanding of the field.

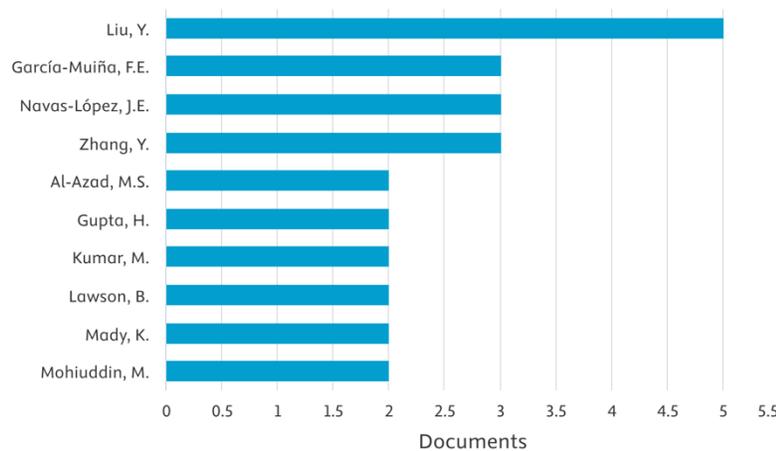


Figure 4. Most influential authors by number of articles published in this field (Top 10)

The remaining authors, including Al-Azad, M.S., Gupta, H., Kumar, M., Lawson, B., Mady, K., and Mohiuddin, M., each contributed two articles. Although their publication counts are slightly lower, their inclusion among the top ten authors highlights their meaningful contributions to the growing body of knowledge in this domain. Overall, the figure suggests that research on SCA is supported by a diverse group of scholars, with a few leading contributors and several emerging researchers collectively strengthening the development of this field.

3.5. Most influential country

Figure 5 presents the top ten countries contributing the highest number of publications in the field of SCA. The distribution highlights the geographical concentration of research activity and reveals which countries play a dominant role in advancing this research area.

The United States ranks first with the highest number of publications, contributing more than thirty documents. This dominant position reflects the strong research infrastructure, extensive academic networks, and long-standing tradition of strategic management research in the country. The United Kingdom and China follow in second and third positions, with approximately nineteen and seventeen publications respectively. These countries have also shown significant engagement in the field, indicating their growing influence in strategic management and sustainability-related research.

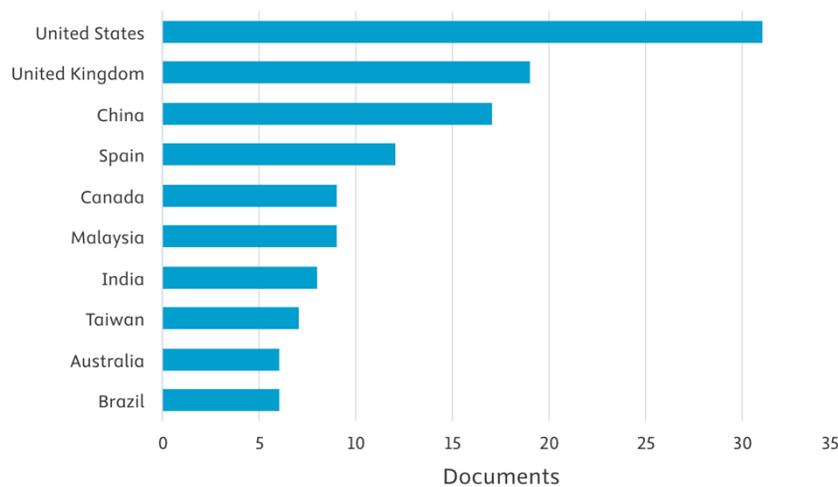


Figure 5. Most influential countries by number of articles published in this field

Other countries such as Spain, Canada, and Malaysia contribute a moderate number of publications, demonstrating the expanding global interest in SCA. Meanwhile, India, Taiwan, Australia, and Brazil complete the top ten list, each contributing a smaller but still notable number of articles. Overall, the figure suggests that while research on SCA is globally distributed, it remains largely concentrated in developed economies and emerging research hubs, reflecting the broader internationalization of management and sustainability research.

3.6. Most influential institution

Figure 6 presents the institutions that have made the most significant contributions to the field based on the number of articles published. The results indicate that Vaasan Yliopisto (University of Vaasa) ranks first with a total of five publications, making it the most productive institution in this research area. This suggests that scholars affiliated with this institution have shown a strong and consistent interest in advancing research within this domain.

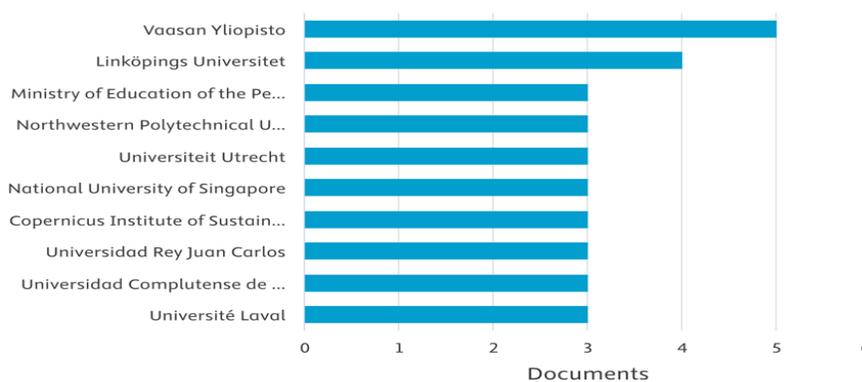


Figure 6. Most influential institution by number of articles published in this field

Following this, Linköping University occupies the second position with four publications. The relatively high number of articles from this institution reflects an active engagement of its research community with the topic and highlights its role as one of the leading contributors to the development of the field.

Several other institutions demonstrate comparable levels of productivity, each contributing three publications. These include the Ministry of Education of the People's Republic of China, Northwestern Polytechnical University, Utrecht University, National University of Singapore, the Copernicus Institute of Sustainable Development, Universidad Rey Juan Carlos, Universidad Complutense de Madrid, and Université Laval. The presence of institutions from diverse geographical regions such as Europe, Asia, and North America indicates that the research topic has attracted broad international academic attention.

3.7. Seminal works on SCA

Table 5 presents the seminal works on SCA based on the number of citations, indicating the most influential publications shaping the development of this research field. Citation counts serve as a proxy for scholarly impact, reflecting how frequently a study has been referenced by subsequent research.

Among the listed studies, Wang et al. (2009) is the most influential work, with 356 citations published in the *Strategic Management Journal*. This study highlights the importance of firm-specific knowledge resources and employee governance mechanisms in achieving competitive advantage. Its strong citation performance indicates the continued relevance of knowledge-based resources and internal governance structures in explaining how organizations sustain competitive advantage over time.

The second most cited work is Vanpoucke et al. (2014) with 292 citations, published in the *Journal of Operations Management*. This research emphasizes the role of supplier integration capabilities within the dynamic capabilities perspective, demonstrating how close collaboration with suppliers can enhance SCA. The prominence of this article reflects the increasing importance of supply chain integration and operational capabilities in strategic management research.

Table 5. Seminal work on SCA

Authors	Year	Title	Source title	Cited by
Wang et al.	2009	Firm-specific knowledge resources and competitive advantage: The roles of economic-and relationship-based employee governance mechanisms	Strategic Management Journal	356
Vanpoucke et al.	2014	Developing supplier integration capabilities for sustainable competitive advantage: A dynamic capabilities approach	Journal of Operations Management	292
Zhang et al.	2023	Open innovation and sustainable competitive advantage: The role of organizational learning	Technological Forecasting and Social Change	170
Shurrab et al.	2019	Green and sustainable practices in the construction industry: A confirmatory factor analysis approach	Engineering, Construction and Architectural Management	144
de Guimarães et al.	2018	The influence of entrepreneurial, market, knowledge management orientations on cleaner production and the sustainable competitive advantage	Journal of Cleaner Production	142

Junaid et al.	2023	Nexus between technology enabled supply chain dynamic capabilities, integration, resilience, and sustainable performance: An empirical examination of healthcare organizations	Technological Forecasting and Social Change	106
Mady et al.	2023	Linking internal environmental capabilities to sustainable competitive advantage in manufacturing SMEs: The mediating role of eco-innovation	Journal of Cleaner Production	96
Brofman et al.	2014	The technological evolution of food traceability systems and their impact on firm sustainable performance: A RBV approach	International Journal of Production Economics	95
Liu	2013	Sustainable competitive advantage in turbulent business environments	International Journal of Production Research	92
Liu et al.	2015	Evaluating and developing resource-based operations strategy for competitive advantage: An exploratory study of Finnish high-tech manufacturing industries	International Journal of Production Research	87

* Citation counts as of February 2026

More recent contributions also show substantial scholarly influence. For example, Zhang et al. (2023), with 170 citations, explores the relationship between open innovation, organizational learning, and SCA, highlighting how knowledge exchange and collaborative innovation contribute to long-term competitiveness. Similarly, Shurrab et al. (2019) and de Guimarães et al. (2018) emphasize the growing relevance of green practices, cleaner production, and sustainability-oriented organizational strategies in achieving competitive advantage, reflecting the integration of environmental considerations into strategic management literature.

Other influential works, such as Junaid et al. (2023) and Mady et al. (2023), focus on technology-enabled supply chain capabilities, resilience, and eco-innovation, demonstrating the evolving role of digitalization and environmental capabilities in sustaining competitive advantage, particularly in sectors such as healthcare and manufacturing SMEs. Meanwhile, earlier studies such as Brofman et al. (2014) and Liu (2013) highlight the significance of resource-based perspectives and technological development in maintaining firm competitiveness in turbulent business environments.

3.8. Keywords co-occurrence analysis

Figure 7 illustrates the keyword co-occurrence network in research on SCA. The visualization maps the relationships among frequently occurring keywords in the literature, where the size of each node represents the frequency of keyword occurrence, the distance between nodes reflects the strength of their relationship, and the lines indicate co-occurrence links between keywords. Different colors represent clusters of related research themes within the SCA literature.

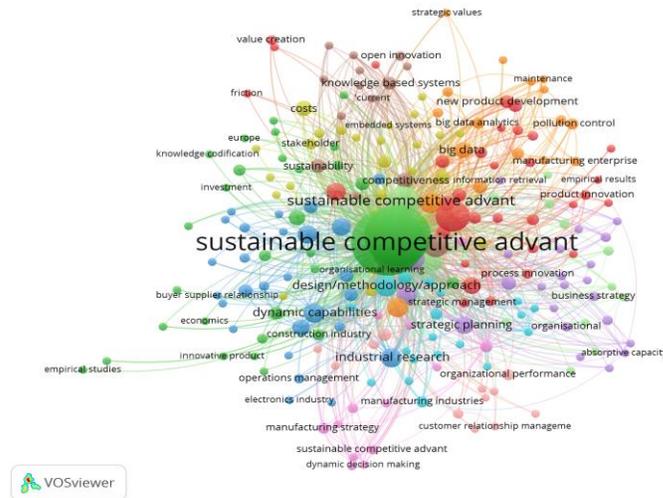


Figure 7. Keyword co-occurrence analysis.

The network is dominated by the keyword “sustainable competitive advantage,” which appears as the largest and most central node in the map. Its central position indicates that it is strongly connected with many other concepts in literature, demonstrating that SCA research is highly interdisciplinary and integrates multiple theoretical and practical perspectives. Closely connected keywords include sustainability, competitiveness, strategic management, dynamic capabilities, innovation, and industrial research, suggesting that the achievement of SCA is frequently examined through strategic, operational, and sustainability-oriented lenses.

Table 6. Clusters of high frequency keywords related to SCA

Cluster	Items (n)	Keywords	Issues / Thematic Focus	Sample Authors (Year)
Cluster 1: Sustainability & Stakeholder Value	16	sustainability, stakeholder, value creation, cleaner production, green practices, environmental orientation	Sustainability practices and stakeholder-oriented strategies as drivers of long-term competitive advantage.	de Guimarães et al. (2018); Shurrab et al. (2019); Sharma & Gupta (2024); Ur Rahman & Amjad (2024)
Cluster 2: Strategic Management & Organizational Performance	15	strategic management, strategic planning, business strategy, organizational performance, competitive strategy	Strategic decision-making and managerial capabilities enabling sustained firm performance.	Wang et al. (2009); Toseef et al. (2022); Zaman et al. (2025); Al-Jaafreh et al. (2023)
Cluster 3: Innovation & Technological Capabilities	14	open innovation, product innovation, process innovation, eco-innovation, new product development, R&D	Technological innovation as a key mechanism for sustainable competitive advantage.	Zhang et al. (2023); Severo et al. (2020); Lim et al. (2010); Mady et al. (2022)

Cluster	Items (n)	Keywords	Issues / Thematic Focus	Sample Authors (Year)
Cluster 4: Dynamic Capabilities & Organizational Learning	13	dynamic capabilities, organizational learning, absorptive capacity, knowledge management capability	Organizational learning and dynamic capabilities supporting adaptive competitiveness.	Vanpoucke et al. (2014); Junaid et al. (2023); Jin & Edmunds (2015); El Hachem et al. (2014)
Cluster 5: Industrial & Manufacturing Applications	12	manufacturing industries, operations strategy, construction industry, industrial research, supply chain management	Industry-specific applications of SCA in manufacturing, construction, and supply chains.	Liu (2013); Liu & Liang (2015); Ditkaew et al. (2020); Chantabutr & Wanarat (2024)
Cluster 6: Data-Driven and Knowledge-Based Systems	10	big data analytics, artificial intelligence, information management capability, digital transformation, data-driven decision making	Digital technologies, big data, and AI enhancing data-driven competitive advantage.	Shah (2022); Wang et al. (2025); Aman et al. (2024); Aburayya (2025)

Cluster 1: Sustainability & Stakeholder Value. This cluster highlights the role of sustainability-oriented strategies and stakeholder-focused practices in achieving SCA. The literature emphasizes that environmental management, cleaner production, and sustainability initiatives can enhance organizational value while simultaneously improving competitive positioning. For example, de Guimarães et al. (2018) demonstrate that strategic orientations such as entrepreneurial, market, and knowledge management orientation can foster cleaner production practices, ultimately strengthening SCA. Similarly, Shurrab et al. (2019) show that the adoption of green construction practices contributes to improved sustainable performance and competitiveness within the construction industry. More recent studies further reinforce this perspective by linking sustainability with emerging technological and strategic initiatives. For instance, Sharma and Gupta (2024) highlight how cleaner production and Industry 5.0 technologies can jointly support sustainability-driven competitiveness, while Ur Rahman and Amjad (2024) illustrate how green finance and sustainable infrastructure enhance resilience and competitive advantage in manufacturing firms. Collectively, this cluster reflects a growing research emphasis on sustainability as a strategic pathway through which organizations create long-term value and maintain competitive advantage.

Cluster 2: Strategic Management & Organizational Performance. The second cluster focuses on strategic management capabilities and leadership mechanisms that enable organizations to sustain competitive advantage. Central to this stream is the resource-based view (RBV), which emphasizes the strategic role of firm-specific resources and governance mechanisms in generating superior performance. For instance, Wang et al. (2009) highlight how firm-specific knowledge resources, supported by effective employee governance mechanisms, contribute significantly to achieving SCA. In addition, leadership and strategic alignment have been identified as critical factors shaping organizational competitiveness. Toseef et al. (2022) demonstrate that strategic leadership behaviors, particularly inspirational motivation and

idealized influence, enhance SCA through IT-business strategic alignment. Similarly, Al-Jaafreh et al. (2023) show that aligning information technology strategy with business strategy strengthens organizational competitiveness through improved information system benefits. In the hospitality sector, Zaman et al. (2025) further emphasize that strategic management of organizational resources plays a key role in enabling hotels to maintain competitiveness in highly dynamic markets. Overall, this cluster underscores the importance of strategic leadership, resource governance, and managerial capabilities in sustaining firm performance and competitive advantage.

Cluster 3: Innovation & Technological Capabilities. This cluster centers on innovation and technological capabilities as critical drivers of SCA. The literature suggests that firms can maintain long-term competitiveness by continuously developing new products, processes, and technological solutions. For instance, Zhang et al. (2023) demonstrate that open innovation enhances SCA through the mediating role of organizational learning and knowledge management capability. Similarly, Severo et al. (2020) highlight that project management practices combined with product and process innovation significantly contribute to sustainable competitiveness among firms. Earlier work by Lim et al. (2010) also shows that innovation strategies in the construction industry can improve competitiveness by balancing cost efficiency and quality improvements. Furthermore, eco-innovation has emerged as an important mechanism linking environmental sustainability with competitive advantage. Mady et al. (2022) find that eco-innovation practices in manufacturing SMEs play a critical role in sustaining competitive advantage by leveraging internal capabilities and environmental strategies. Taken together, the studies in this cluster indicate that innovation capabilities are central to enabling firms to adapt to market changes and maintain long-term competitiveness.

Cluster 4: Dynamic Capabilities & Organizational Learning. The fourth cluster emphasizes the importance of dynamic capabilities and organizational learning in enabling firms to respond to changing market environments and sustain competitive advantage. Building on dynamic capability theory, Vanpoucke et al. (2014) demonstrate that supplier integration capabilities allow firms to sense and respond to supply chain changes, thereby enhancing operational performance and sustainable competitive advantage. Similarly, Junaid et al. (2023) show that supply chain dynamic capabilities improve resilience and integration within healthcare organizations, ultimately strengthening sustainable supply chain performance. From a resource-based perspective, Jin and Edmunds (2015) highlight how supply chain network resources, capabilities, and practices collectively contribute to firm competitiveness. In addition, organizational learning mechanisms are essential in strengthening a firm's adaptive capacity. El Hachem et al. (2014) propose a systemic assessment framework that integrates organizational learning into the evaluation of competitive positioning. Overall, this cluster indicates that firms must continuously develop learning capabilities and reconfigure resources to maintain sustainable competitiveness in dynamic business environments.

Cluster 5: Industrial & Manufacturing Applications. This cluster reflects the application of sustainable competitive advantage concepts within specific industrial contexts, particularly manufacturing, construction, and supply chain systems. Studies in this stream focus on operational strategies and resource allocation mechanisms that enhance competitiveness at the industry level. For example, Liu (2013) demonstrates that manufacturing firms can achieve sustainable competitive advantage by optimizing operational strategies and resource allocation in turbulent business environments. Extending this perspective, Liu and Liang (2015) explore how resource-based operations strategies can strengthen operational competitiveness within

high-tech manufacturing industries. Empirical evidence from the agricultural sector also supports the role of operational capabilities in achieving competitiveness. Ditkaew et al. (2020) find that accounting information system quality enhances supply chain management capability, which in turn improves sustainable competitive advantage among maize producers. Similarly, Chantabutr and Wanarat (2024) highlight the role of human capital and employee performance in strengthening operational productivity and competitive advantage in the banking sector. Overall, this cluster illustrates how SCA frameworks are applied across industries to improve operational performance and competitiveness.

Cluster 6: Data-Driven and Knowledge-Based Systems. The final cluster reflects emerging research exploring the role of digital technologies and data-driven capabilities in sustaining competitive advantage. In the digital era, firms increasingly rely on advanced analytics, artificial intelligence, and information management systems to enhance decision-making and competitiveness. For example, Shah (2022) proposes a knowledge-based framework that integrates big data analytics with managerial capabilities to achieve sustainable competitive advantage. Similarly, Wang et al. (2025) demonstrate that data-driven decision-making and digital leadership significantly enhance organizational creativity and competitiveness among SMEs undergoing digital transformation. Research in healthcare and other sectors further supports the strategic role of digital technologies (Tappy & Mandagi, 2025; Tappy & Mandagi, 2023). Aman et al. (2024) show that big data analytics serves as a critical enabler for improving operational efficiency and achieving sustainable competitive advantage. Likewise, Aburayya (2025) finds that artificial intelligence and knowledge processes strengthen firms' competitive positioning by improving operational engagement and decision-making. Collectively, this cluster indicates that digital transformation and advanced analytics are becoming increasingly important resources for achieving sustainable competitive advantage in modern organizations.

3.9. Overlay visualization of keywords over time

Figure 8 presents the overlay visualization of keyword co-occurrence in SCA research, illustrating the temporal evolution of major research themes in the field. In this visualization, node size represents the frequency of keyword occurrence, while the color gradient reflects the average publication year of the keywords. Darker blue nodes indicate earlier research themes, green nodes represent intermediate developments, and yellow nodes highlight more recent or emerging research directions.

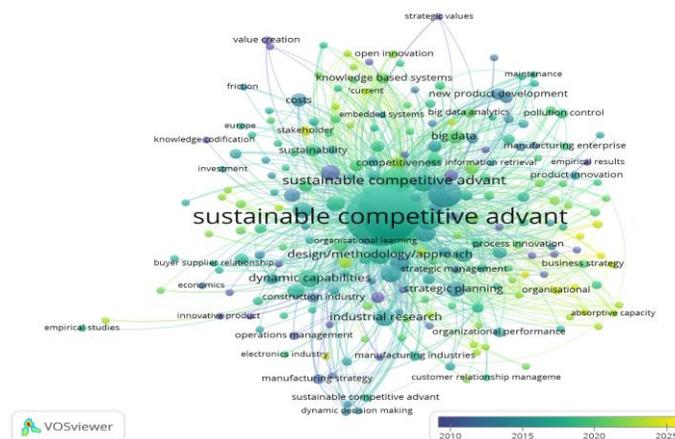


Figure 8. Overlay visualization of keywords over time

Early studies in the SCA literature were largely grounded in resource-based and strategic management perspectives, focusing on internal firm resources, operational strategies, and knowledge-based capabilities. Keywords appearing in darker blue tones, such as value creation, strategic values, and knowledge codification, reflect these foundational theoretical discussions. For instance, Wang et al. (2009) emphasize the role of firm-specific knowledge resources and governance mechanisms in generating sustainable competitive advantage, while Liu (2013) and Liu and Liang (2015) highlight how resource-based operational strategies and decision-support systems can help firms sustain competitiveness in turbulent business environments. Similarly, Shim and Lee (2012) and Toor and Ofori (2010) demonstrate how technological competencies and organizational psychological capital can serve as strategic resources that strengthen long-term competitive positioning.

During the intermediate development phase of SCA research, shown by green-colored nodes, scholars increasingly incorporated themes related to innovation, sustainability, and dynamic capabilities. Keywords such as sustainability, stakeholder, dynamic capabilities, open innovation, and knowledge-based systems illustrate the expansion of SCA research beyond traditional strategic management approaches. Studies during this period emphasize how innovation capabilities, supply chain integration, and organizational learning contribute to sustainable competitiveness. For example, Vanpoucke et al. (2014) demonstrate that supplier integration capabilities enable firms to adapt to environmental changes and improve operational performance. Similarly, Jin and Edmunds (2015) highlight the importance of supply chain network resources and capabilities in achieving competitive advantage. Research on innovation and sustainability also became prominent, as illustrated by Brofman Epelbaum and Martinez (2014), who examine technological innovation in food traceability systems, and de Guimarães et al. (2018), who show how entrepreneurial orientation and cleaner production strategies strengthen sustainable competitive advantage.

More recent research trends, represented by yellow nodes, indicate a shift toward digital transformation, sustainability-driven innovation, and advanced technological capabilities. Keywords such as big data analytics, absorptive capacity, business strategy, and process innovation reflect the increasing importance of digital technologies and data-driven decision-making in modern competitive environments. For instance, Shah (2022) highlights the strategic role of big data analytics in transforming organizational knowledge into sustainable competitive advantage. Similarly, Aman et al. (2024) and Aburayya (2025) demonstrate how big data analytics and artificial intelligence can enhance operational efficiency and decision-making capabilities. In addition, sustainability-driven innovation has become a major focus, as illustrated by Gao et al. (2021) and Mady et al. (2022), who show that green innovation and eco-innovation strategies significantly contribute to sustainable competitiveness. Emerging studies also emphasize the integration of advanced technologies and digital leadership in achieving competitive advantage, as demonstrated by Wang et al. (2025) and Islam et al. (2025).

4. Conclusions and Direction for Future Research

This study provides a comprehensive overview of the intellectual structure and development of research on SCA through bibliometric and keyword co-occurrence analyses. The findings reveal that SCA research has evolved from traditional strategic management perspectives toward more interdisciplinary approaches that integrate sustainability, innovation, and digital transformation. The keyword network analysis shows that SCA functions as the central concept connecting multiple research streams, including strategic management,

innovation, operations management, and sustainability studies. The cluster analysis further indicates that the literature is organized around several key thematic areas, namely sustainability and stakeholder value, strategic management and organizational performance, innovation and technological capabilities, dynamic capabilities and organizational learning, industrial and operational applications, and data driven capabilities.

The overlay visualization also highlights the temporal evolution of SCA research. Earlier studies primarily focused on resource based and knowledge based perspectives, emphasizing firm specific resources, governance mechanisms, and operational strategies as the foundations of sustainable advantage. Later research expanded the discussion by incorporating innovation capabilities, supply chain integration, and sustainability oriented strategies. More recent studies increasingly emphasize digital technologies, big data analytics, artificial intelligence, and eco innovation as strategic resources that support long term competitiveness. This development indicates that contemporary SCA research increasingly focuses on technology enabled and sustainability oriented competitive strategies.

From a theoretical perspective, this study contributes to the literature by synthesizing fragmented research streams and demonstrating how multiple theoretical perspectives collectively shape the development of SCA research. The findings show that SCA is increasingly conceptualized as a multidimensional construct influenced not only by internal resources but also by innovation capabilities, sustainability practices, and digital transformation. By mapping these interconnected themes, the study provides a clearer understanding of the evolving intellectual structure of the SCA field.

This study also provides several directions for future research. First, future studies should further explore the integration of sustainability strategies with digital technologies, particularly the role of artificial intelligence, big data analytics, and advanced digital systems in supporting sustainable competitiveness. Second, future research may examine the role of organizational capabilities such as absorptive capacity, entrepreneurial competencies, and strategic leadership in strengthening SCA across different industries. Third, there is a need for more contextual and comparative studies, particularly in emerging economies and small and medium sized enterprises, where digital transformation and sustainability practices may produce distinct competitive dynamics. Finally, interdisciplinary research that integrates strategic management, sustainability studies, and digital innovation may provide deeper insights into how organizations can maintain competitiveness in rapidly changing environments.

Despite its contributions, this study has several limitations. First, the bibliometric analysis was conducted using publications indexed in a single database, which may limit the coverage of relevant studies available in other academic sources. Second, the analysis relied on keyword co-occurrence and citation patterns, which reflect structural relationships within the literature but may not fully capture the conceptual depth of individual studies. Third, the interpretation of clusters and thematic developments may involve a degree of subjectivity that is inherent in bibliometric visualization techniques. Future research could address these limitations by incorporating multiple databases, applying complementary review methods such as systematic literature reviews or meta-analysis, and employing additional analytical techniques to provide a more comprehensive understanding of SCA research.

Daftar Pustaka

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