

Research Trends on Intellectual Capital and Competitive Advantage

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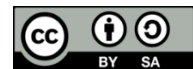
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ABSTRACT

This study provides a comprehensive bibliometric analysis of intellectual capital research, exploring its evolution, key themes, and global collaboration patterns. Using Scopus as the primary data source and VOSviewer for visualization, the study identifies major research clusters, influential authors, and emerging trends in intellectual capital and competitive advantage. The findings highlight a shift from knowledge management and information systems toward sustainability, corporate governance, and financial performance. The study also underscores the increasing role of digital transformation in intellectual capital research, emphasizing the integration of intangible assets with technological advancements. Additionally, the analysis reveals significant regional collaborations, with Spain, the United States, the United Kingdom, and emerging Asian economies playing dominant roles. The study contributes to the literature by offering insights into the theoretical and practical implications of intellectual capital management and its strategic impact on long-term business success.

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1. INTRODUCTION

In today's rapidly evolving global economy, the strategic management of intangible assets has become increasingly vital for organizational success. Intellectual capital, which encompasses the collective knowledge, skills, and innovative capabilities of an organization, represents a critical asset that drives competitive performance [1]. As industries shift from a reliance on physical and financial resources to a focus on knowledge-based assets, firms are recognizing that their true value often lies in the unique expertise and relational networks

of their employees. This realization has spurred a growing interest among scholars and practitioners in understanding how intellectual capital can be effectively harnessed to foster innovation, improve operational efficiency, and sustain long-term competitive advantage [2]. In this context, intellectual capital is not only a measure of an organization's internal capabilities but also a strategic resource that can differentiate firms in increasingly competitive markets. Consequently, the integration of intellectual capital management into core business

strategies has emerged as a critical focus in contemporary research and practice [3].

Over the past few decades, scholarly interest in intellectual capital has grown significantly, reflecting its rising prominence as a key driver of organizational performance. Early foundational studies by [4] and [5] were instrumental in conceptualizing intellectual capital as comprising human, structural, and relational components. These seminal works laid the groundwork for subsequent research that sought to quantify and manage intangible assets in diverse organizational contexts. As academics began to explore the nuances of knowledge creation, sharing, and utilization, a range of models and measurement techniques emerged to capture the multifaceted nature of intellectual capital [6]. This evolution in thought has not only enriched our theoretical understanding but also influenced practical approaches to strategic management. Today, intellectual capital is recognized as a critical element in achieving sustainable competitive advantage, prompting continuous inquiry into its effective deployment and impact on long-term organizational success.

Competitive advantage has long been a central focus in strategic management, with scholars emphasizing the importance of unique resources and capabilities in outperforming rivals. Pioneered by [7], the concept underscores how firms can achieve superior performance through differentiation and cost leadership. In recent years, intellectual capital has emerged as a crucial resource that contributes significantly to a firm's competitive positioning. By leveraging human expertise, innovative processes, and robust relational networks, organizations can develop distinctive competencies that are difficult for competitors to replicate [8]. This integration of intellectual capital into the broader strategic framework not only enhances innovation and operational efficiency but also creates barriers to entry in competitive markets. As industries become increasingly knowledge-intensive, the interplay between intellectual capital and competitive advantage continues to attract

substantial scholarly attention, prompting further exploration of its role in driving sustainable business success.

The advent of digital technologies has further transformed the landscape of intellectual capital management, introducing novel ways for organizations to create, capture, and leverage knowledge. Digitalization enables the rapid dissemination of information, facilitates real-time collaboration, and enhances the analytical capabilities of firms, thereby augmenting the value of intellectual capital [8], [9]. As organizations increasingly rely on digital platforms and data-driven decision-making, the traditional boundaries of intellectual capital are expanding to incorporate new forms of digital knowledge and technological innovation. This shift has prompted researchers to examine how digital transformation intersects with human, structural, and relational capital, and how these interdependencies contribute to a firm's ability to innovate and compete effectively. In this dynamic environment, understanding the synergies between digital technologies and intellectual capital is essential for developing robust strategies that ensure sustainable competitive advantage. Such insights are increasingly critical for organizations seeking to adapt to ever-changing market demands and technological disruptions [10]–[12]. Thus, integrating digital innovation with traditional intellectual capital practices has become a pivotal area of study.

Despite the extensive research on intellectual capital and competitive advantage, significant gaps remain in synthesizing these two domains into a unified framework. Many studies have focused exclusively on either the measurement of intangible assets or the strategic implications of competitive positioning, often neglecting the interdependencies that exist between these constructs [13]. The fragmentation of research methodologies and the dynamic nature of modern business environments have contributed to an incomplete understanding of how intellectual capital drives sustained competitive success.

Moreover, rapid advancements in technology and globalization have further complicated traditional models, necessitating a re-examination of established theories. Addressing these challenges requires an interdisciplinary approach that not only bridges theoretical divides but also offers practical insights for effective management [14], [15]. This study endeavors to integrate the diverse strands of literature, thereby providing a comprehensive perspective on the evolving role of intellectual capital in shaping competitive advantage. These insights reveal a critical need for comprehensive synthesis that sets the stage for the present investigation.

Notwithstanding the substantial advancements in the literature, challenges impede a cohesive understanding of the nexus between intellectual capital and competitive advantage. Researchers face difficulties in reconciling varied measurement approaches and theoretical models, which has led to fragmented findings across studies [16]. The dynamic and context-specific nature of intangible assets further complicates efforts to develop standardized metrics. Additionally, rapid technological changes and evolving market conditions have rendered some traditional frameworks obsolete, limiting their applicability in contemporary settings. These issues highlight the urgent need for a comprehensive, integrative analysis that can bridge existing gaps and offer guidance to scholars and practitioners.

The objective of this study is to systematically analyze and synthesize research trends related to intellectual capital and competitive advantage. By reviewing a wide range of empirical and theoretical studies, the research aims to identify key themes, methodological approaches, and emerging challenges in the field. This comprehensive analysis seeks to bridge the gap between disparate perspectives and offer a cohesive framework that enhances our understanding of how intangible assets contribute to sustained business success. Ultimately, the study aspires to provide strategic insights that inform future research

and practical applications, thereby guiding organizations in leveraging intellectual capital for competitive performance.

2. LITERATURE REVIEW

2.1 *Conceptualization of Intellectual Capital*

Intellectual capital (IC) is a fundamental intangible asset that contributes significantly to organizational performance and competitive advantage. The concept of IC was initially developed to address the gap between the market and book values of firms, emphasizing the role of knowledge-based resources [17], [18]. Intellectual capital is commonly categorized into three primary components: human capital, structural capital, and relational capital. Human capital refers to the knowledge, skills, experiences, and creativity possessed by employees. This element is considered the most crucial component of IC, as it directly influences innovation and strategic decision-making [19]. Structural capital includes organizational processes, databases, patents, and intellectual property that support knowledge retention and dissemination. Finally, relational capital pertains to an organization's external relationships with customers, suppliers, stakeholders, and other entities that contribute to value creation. The increasing focus on knowledge-driven economies has elevated the importance of IC as a determinant of sustainable competitive advantage. Organizations that effectively manage and integrate these three dimensions can enhance their long-term value and differentiation in competitive markets [20]. However, despite its significance, scholars continue to debate the best ways to measure and leverage IC for business success.

2.2 *Theoretical Frameworks on Intellectual Capital and Competitive Advantage*

Various theoretical frameworks have been proposed to explain the role of intellectual capital in achieving competitive advantage. Among them, the resource-based view (RBV) is one of the most widely cited approaches. According to [21], firms achieve sustainable competitive advantage by

acquiring and developing resources that are valuable, rare, inimitable, and non-substitutable (VRIN criteria). Intellectual capital, particularly human and relational capital, meets these criteria, as knowledge and relationships are often unique and difficult to replicate. Another influential perspective is the knowledge-based view (KBV), which extends RBV by emphasizing that knowledge is the most strategically important resource in firms [22]. This theory posits that organizations that efficiently create, transfer, and apply knowledge can sustain their competitive edge. KBV highlights the importance of dynamic capabilities, suggesting that firms must continuously adapt and renew their knowledge assets to respond to evolving market conditions [23].

Furthermore, the Intellectual Capital Model (ICM) developed by Edvinsson and Malone (1997) provides a structured approach to managing intangible assets. This model categorizes IC into human, organizational, and customer capital, aligning closely with the broader conceptualization of IC. ICM underscores the need for systematic measurement and reporting mechanisms to optimize the contribution of IC to business performance. These theoretical perspectives provide a strong foundation for understanding the interplay between IC and competitive advantage. However, the growing complexity of global markets necessitates further empirical validation and refinement of these models.

2.3 Intellectual Capital and Innovation

Innovation is widely recognized as a key driver of competitive advantage, and intellectual capital plays a central role in fostering an organization's innovative capabilities. Firms with strong IC foundations are better positioned to generate new ideas, improve processes, and develop groundbreaking products and services [24]–[26]. Human capital, particularly in the form of skilled employees and R&D teams, serves as the primary source of knowledge creation and technological advancement. Structural capital, such as knowledge management systems and research infrastructure,

facilitates the efficient storage and transfer of intellectual assets, ensuring that firms can continuously leverage their accumulated knowledge.

Relational capital also contributes to innovation by enabling organizations to collaborate with external partners, universities, and research institutions. Open innovation models emphasize that knowledge exchange beyond organizational boundaries can accelerate technological progress and enhance market competitiveness [27]. Given the importance of IC in fostering innovation, firms must strategically invest in intellectual capital development through training programs, knowledge-sharing initiatives, and strategic partnerships. The integration of IC management with innovation strategies can significantly enhance a firm's ability to sustain a competitive edge in dynamic markets.

2.4 The Role of Digitalization in Intellectual Capital Management

The digital revolution has transformed the way organizations manage intellectual capital, introducing new tools and platforms for knowledge creation, collaboration, and analysis. Digitalization enhances the accessibility, scalability, and impact of IC, making it easier for firms to leverage intangible assets for competitive advantage. Advanced technologies such as artificial intelligence (AI), big data analytics, cloud computing, and blockchain have reshaped how firms store and utilize knowledge. AI-powered systems enable organizations to automate knowledge-intensive processes, while big data analytics provide insights that drive strategic decision-making. Moreover, digital platforms facilitate real-time collaboration among employees and external stakeholders, thereby strengthening relational capital. Virtual teams and remote work technologies allow firms to harness global expertise and foster innovation at an unprecedented scale. However, the increasing reliance on digitalization also presents challenges, including data security risks, intellectual property concerns, and the need for continuous upskilling of employees.

Organizations must navigate these complexities to maximize the benefits of digital IC management while mitigating potential drawbacks.

3. METHODS

This study employs a bibliometric analysis approach using Scopus as the sole data source and VOSviewer for data visualization and network analysis. Bibliometric analysis is a quantitative method used to evaluate publication trends, citation structures, and thematic evolutions within a research field. The study follows a structured process comprising data collection, preprocessing, analysis, and visualization. First, relevant academic literature was retrieved from Scopus, ensuring a high-quality dataset of peer-reviewed journal articles and conference proceedings published between 2000 and 2024. The search query was designed to capture relevant publications using keywords such as “intellectual capital”, “competitive advantage”, “knowledge management”, and “innovation”. The initial dataset was refined by applying inclusion criteria (English-language, peer-reviewed journal articles, and conference papers) and exclusion criteria (duplicates, book chapters, editorials, and non-relevant studies). Second, the retrieved dataset was exported in CSV format (including metadata such as titles, abstracts, authors, keywords, citations, and references) and then imported into VOSviewer for analysis. Using VOSviewer, network maps were generated to visualize co-authorship networks (author collaborations), keyword co-occurrences (research themes), and citation networks (influential studies and authors). The study specifically analyzed keyword clustering to identify dominant research themes and citation analysis to determine the most influential papers, journals, and institutions. The bibliometric findings were interpreted to provide insights into the evolution of research on intellectual capital and competitive advantage, highlighting

emerging trends, key contributors, and potential research gaps.

4. RESULTS AND DISCUSSION

4.1 Keyword Co-Occurrence Network

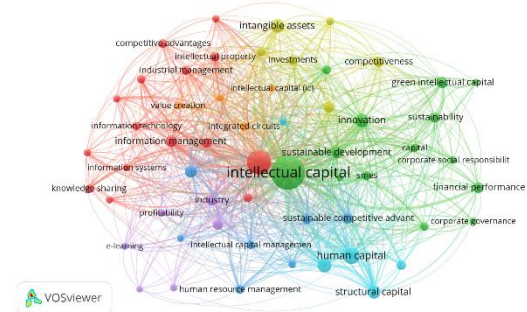


Figure 1. Network Visualization

Source: Data Analysis, 2025

This figure is a bibliometric network visualization generated using VOSviewer, showcasing the research trends related to intellectual capital and its connections to various topics. The visualization is composed of interconnected nodes and edges, where the size of each node represents the frequency or prominence of a specific keyword in the research literature. The central and largest node, “intellectual capital,” indicates its dominance in scholarly discussions, with numerous related concepts branching from it. The different colors in the visualization represent thematic clusters, indicating the diverse research perspectives on intellectual capital. The red cluster is strongly associated with information management, information technology, knowledge sharing, and industrial management, highlighting the technological and management-oriented aspects of intellectual capital. Meanwhile, the green cluster is closely related to sustainability, corporate governance, financial performance, and corporate social responsibility, suggesting a strong link between intellectual capital and sustainable business practices. This reflects a growing academic focus on how intellectual capital contributes to long-term competitive advantages.

Another significant cluster, the blue cluster, revolves around human capital, structural capital, and intellectual capital

management, emphasizing the importance of internal organizational assets such as employees, skills, and knowledge structures. This highlights the role of effective knowledge management and HRM strategies in leveraging intellectual capital for organizational success. Additionally, the yellow cluster contains topics such as innovation, competitiveness, and investments, showing how intellectual capital plays a crucial role in fostering business innovation and economic growth. This network visualization provides a comprehensive overview of research trends on intellectual capital. The strong interconnections among different concepts suggest that intellectual capital is a multidisciplinary field, influencing domains such as business management, technology, sustainability, and economic performance. Researchers and practitioners can use this map to identify emerging topics, potential collaboration areas, and critical research gaps in the field of intellectual capital.

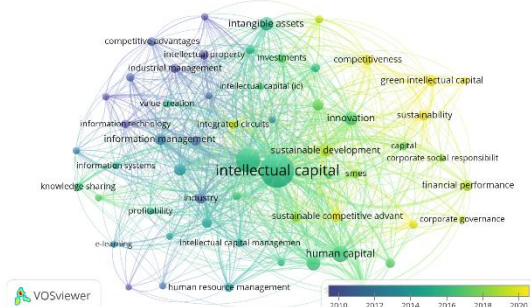


Figure 2. Overlay Visualization
Source: Data Analysis, 2025

This figure represents a bibliometric analysis of research trends related to intellectual capital, created using VOSviewer. The node size indicates the prominence of specific keywords in academic literature, while the color gradient (from blue to yellow) represents the average publication year, as shown in the scale at the bottom. The central node, "intellectual capital," is the most researched concept, with strong connections to various related topics. The presence of multiple clusters suggests that intellectual capital research spans across various disciplines, including business, technology, and sustainability. The blue and purple

clusters (2010–2014) focus on information technology, information management, industrial management, and competitive advantages, reflecting earlier research that emphasized the role of intellectual capital in corporate management, knowledge sharing, and industrial applications. As research evolved, green and yellow clusters (2016–2020) emerged, highlighting newer trends such as sustainability, green intellectual capital, corporate governance, and financial performance. This indicates a shift towards understanding how intellectual capital contributes to corporate social responsibility, innovation, and long-term sustainability. This visualization reveals an evolutionary trend in intellectual capital research, moving from a focus on knowledge management and technological applications towards sustainability, governance, and financial impact. The interconnected nature of these themes suggests that intellectual capital is a multidimensional field that continues to adapt to global business challenges. Future research may continue exploring how intellectual capital contributes to sustainable development, digital transformation, and competitive advantage in various industries.

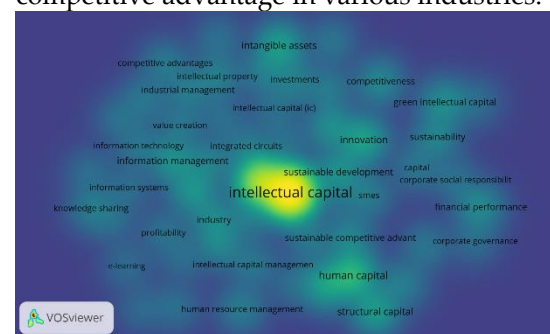


Figure 3. Density Visualization
Source: Data Analysis, 2025

This figure is a density visualization generated using VOSviewer, illustrating the prominence and concentration of research topics related to intellectual capital. The color intensity indicates the frequency and relevance of specific keywords in academic literature, with yellow areas representing high research density and blue areas representing lower density. The brightest and most central area, "intellectual capital," signifies its dominant role in the research

landscape, with sustainable development, human capital, and innovation also showing significant attention. Moving outward, less intense green and blue areas correspond to emerging or less frequently studied topics such as corporate social responsibility, financial performance, and competitive advantages. These terms are still connected to intellectual capital but have received comparatively less focus. This visualization suggests that research in intellectual capital has expanded from core themes like knowledge management and human capital to broader areas like sustainability, governance, and corporate competitiveness. Future research may continue exploring these less-developed areas to deepen the understanding of intellectual capital's role in business and economic growth.

4.2 Co-Authorship Network

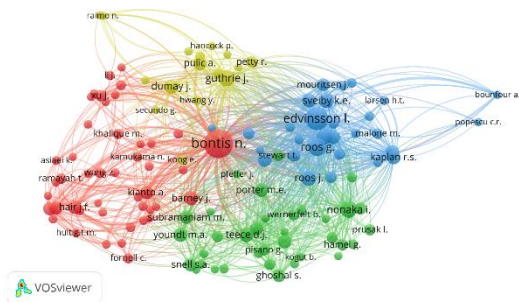


Figure 4. Author Visualization

Source: Data Analysis, 2025

This visualization, created using VOSviewer, represents a bibliometric co-citation network of influential authors in the field of intellectual capital research. The nodes represent authors, with larger nodes indicating higher citation frequency, while edges (connections) represent co-citation relationships. The different colors signify clusters of researchers who frequently cite each other, indicating thematic groupings. Bontis N. appears as the most central and highly cited author (red cluster), followed by Edvinsson L. (blue cluster) and Nonaka I. (green cluster), suggesting their foundational contributions to the field. The red cluster focuses on knowledge management and intellectual capital measurement, the green cluster on organizational learning and competitive advantage, and the blue cluster

on intellectual capital frameworks and corporate reporting. The yellow cluster, including Pulic A. and Guthrie J., appears to focus on intellectual capital disclosure and reporting practices.

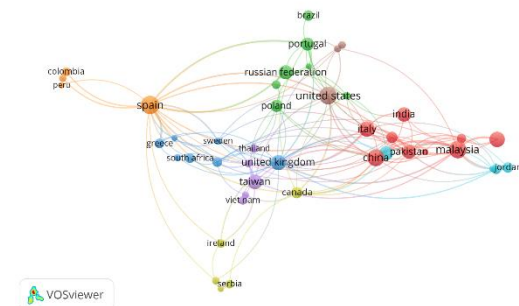


Figure 5. Country Visualization

Source: Data Analysis, 2025

This co-authorship network visualization, generated using VOSviewer, represents collaborations between countries in intellectual capital research. Each node represents a country, with larger nodes indicating more publications and edges (connections) representing co-authorship links. Different colors indicate distinct clusters of closely collaborating countries. Spain appears as a central hub (orange cluster), with strong connections to Colombia, Peru, and Greece, suggesting its influential role in Spanish-speaking academic networks. The United Kingdom and the United States (blue and green clusters) are also central, showing strong international collaboration with European and North American countries. The red cluster represents China, Malaysia, Pakistan, and India, indicating significant co-authorship within Asian research networks. The presence of multiple interconnections across regions suggests that intellectual capital research is highly globalized, with diverse collaboration patterns between Europe, Asia, and the Americas.

DISCUSSION

The results of the bibliometric analysis provide significant insights into the evolution and current trends of intellectual capital research. The network visualizations illustrate the interconnections between keywords, influential authors, and global research collaborations. Intellectual capital

(IC) has evolved into a multidisciplinary field, encompassing domains such as knowledge management, sustainability, competitive advantage, corporate governance, and financial performance. The findings indicate a shift in focus from fundamental knowledge and industrial applications to sustainability-driven and governance-related research.

Thematic Clustering in Intellectual Capital Research

The keyword network analysis reveals distinct thematic clusters in intellectual capital research. The red cluster predominantly includes topics such as knowledge management, information technology, industrial management, and value creation, highlighting the early focus on leveraging intellectual capital for business efficiency and competitive advantage. This aligns with foundational theories that emphasize the role of intangible assets in creating long-term value for organizations. The presence of profitability, integrated circuits, and e-learning within this cluster indicates that early research was heavily influenced by knowledge-based industries, particularly in technology and education sectors. In contrast, the green and blue clusters represent the emergence of newer themes, such as sustainability, corporate governance, and financial performance. The integration of green intellectual capital, corporate social responsibility (CSR), and sustainable development suggests a growing interest in how organizations can leverage intellectual capital for ethical and long-term sustainable growth. This shift reflects global trends emphasizing environmental, social, and governance (ESG) criteria in corporate decision-making. Moreover, the presence of corporate governance, financial performance, and competitiveness in the same clusters indicates an increasing focus on the strategic role of intellectual capital in improving business sustainability and financial outcomes.

Evolution of Intellectual Capital Research Over Time

The temporal overlay visualization demonstrates a clear evolution in the focus of

intellectual capital research. Earlier research (2010–2014) emphasized knowledge management, information systems, and information technology, reflecting a time when companies were beginning to acknowledge the value of intangible assets in their strategic planning. However, from 2015 onward, there has been a noticeable shift toward sustainability, innovation, and corporate social responsibility. This transition aligns with global movements advocating for responsible business practices and sustainability-driven corporate governance. A critical insight from this evolution is the growing interplay between intellectual capital and sustainability. Organizations are increasingly recognizing intellectual capital as a means to achieve sustainable competitive advantages. The recent focus on green intellectual capital, sustainable competitive advantage, and corporate social responsibility underscores the necessity for companies to align their intangible assets with long-term environmental and social goals.

Influence of Key Authors in Intellectual Capital Research

The co-citation analysis identifies highly influential authors in the field of intellectual capital. Nick Bontis appears as a central figure, with a vast number of citations and co-authorship connections. His research on intellectual capital measurement, knowledge management, and value creation has laid the foundation for subsequent studies. Similarly, Leif Edvinsson, known for his pioneering work on intellectual capital reporting, and Ikujiro Nonaka, recognized for his contributions to organizational learning and knowledge creation, have significantly shaped the field. The clustering of authors suggests different intellectual traditions within intellectual capital research. The red cluster, led by Bontis and Barney, is deeply rooted in strategic management and organizational performance. Meanwhile, the blue cluster, featuring Edvinsson and Kaplan, focuses on intellectual capital reporting, measurement, and corporate governance. The green cluster, associated with Nonaka and Teece, aligns more with organizational

learning and knowledge-based views of the firm. This distribution of authors reflects the diverse applications of intellectual capital across business disciplines.

Global Collaboration in Intellectual Capital Research

The country-based co-authorship network analysis highlights the globalized nature of intellectual capital research. Spain emerges as a major hub, with strong collaborative ties to Latin American countries such as Colombia and Peru, indicating that Spanish-speaking scholars have built a robust research network in intellectual capital studies. Similarly, the United Kingdom and the United States are prominent players, collaborating with a wide range of European and North American institutions. This suggests that English-speaking researchers dominate much of the discourse on intellectual capital. A notable trend is the increasing contribution of Asian countries, particularly China, Malaysia, India, and Pakistan. These nations form a tightly connected research cluster, indicating a regional focus on intellectual capital. The emphasis on industrial applications, competitiveness, and financial performance in this cluster suggests that emerging economies are leveraging intellectual capital as a key driver of economic growth. The involvement of Portugal, Poland, and Russia in intellectual capital research also highlights the diversification of scholarly contributions from both developed and developing economies. However, some regions remain underrepresented. Countries in Africa, the Middle East, and smaller economies in Southeast Asia exhibit limited co-authorship connections, indicating a potential gap in intellectual capital research. Future efforts should encourage cross-regional collaboration to ensure a more inclusive global discourse on the subject.

Implications for Future Research and Practice

The insights gained from the bibliometric analysis have several implications for future research and practice. First, the integration of intellectual capital with sustainability and corporate governance

suggests new research avenues. Scholars should explore how organizations can effectively manage intellectual capital to meet sustainability goals, particularly in the context of climate change, social responsibility, and governance transparency. Second, there is an opportunity to further investigate the role of intellectual capital in the digital economy. With increasing reliance on artificial intelligence, big data, and automation, intellectual capital is likely to play an even greater role in shaping competitive advantages. Future studies should examine the intersection of intellectual capital, digital transformation, and innovation management. Third, practitioners can leverage the findings to develop more robust intellectual capital strategies. Companies should focus on holistic intellectual capital management, integrating human, structural, and relational capital to enhance competitiveness and sustainability. Policymakers, too, can benefit from these insights by designing policies that encourage knowledge-based economic growth, particularly in developing countries where intellectual capital research is still in its nascent stages.

Limitations of the Study

Despite its valuable contributions, this study has some limitations. The bibliometric analysis relies on indexed publications, which may exclude non-indexed yet relevant literature. Additionally, while co-citation and co-authorship analyses provide insights into research collaboration, they do not capture the qualitative depth of scholarly contributions. Future research could complement bibliometric techniques with systematic literature reviews and case studies to gain deeper insights. Furthermore, while the study identifies influential countries and researchers, it does not delve into the specific socio-economic or policy-related factors driving intellectual capital research in different regions. Addressing these gaps could provide a more contextualized understanding of intellectual capital development worldwide.

5. CONCLUSION

The bibliometric analysis of intellectual capital research highlights key trends, influential authors, and global collaboration networks. The evolution of research themes from knowledge management and information technology to sustainability, corporate governance, and financial performance underscores the growing importance of intellectual capital in shaping modern business strategies. The co-authorship network analysis further reveals regional clusters of intellectual capital

research, with strong contributions from Spain, the United Kingdom, the United States, and emerging economies in Asia. Future research should expand the scope of intellectual capital studies, particularly in underrepresented regions, and explore its role in the digital economy and sustainability-driven business models. By leveraging intellectual capital effectively, organizations and policymakers can foster innovation, competitiveness, and long-term economic growth in an increasingly knowledge-based world.

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