

Article

Intellectual Capital History and Trends: A Bibliometric Analysis Using Scopus Database

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Abstract: This article aims to provide a bibliometric analysis of intellectual capital research published in the Scopus database from 1956 to 2020 to trace the development of scientific activities that can pave the way for future studies by shedding light on the gaps in the field. The analysis focuses on 638 intellectual capital-related papers published in the Scopus database over 60 years, drawing upon a bibliometric analysis using VOSviewer. This paper highlights the mainstream of the current research in the intellectual capital field, based on the Scopus database, by presenting a detailed bibliometric analysis of the trend and development of intellectual capital research in the past six decades, including journals, authors, countries, institutes, co-occurrence, and author's keywords. The findings imply that intellectual capital researchers do not use broad relevant theories and findings from studies beyond their clusters. Another result is that developing nations continue to be underexplored in terms of intellectual property research due to a lack of trust representation and a lack of appropriate investigators. Finally, the data analysis identifies a number of potential research issues to be investigated regarding intellectual capital development, which serve as raw material for future research. Once again, this study provides a framework for firms to build and implement intellectual capital development plans.

Keywords: intellectual capital; bibliometric analysis; Scopus database; VOSviewer; author keyword co-occurrences; co-authorship; and trends



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1. Introduction

At a worldwide level, intellectual capital (IC) began to be studied in the 1960s as a way to gain a competitive advantage in industries that place emphasis on knowledge and learning, as well as the growth of communication and information technologies [1]. The development of research in the field of intellectual capital was built on the principle that intangible assets in companies should be valued. In 1963, the concept “human asset accounting” was used to describe the inclusion of people in financial accounts, recognizing the potential worth of businesses and fixed assets [2]. The term intellectual capital was coined by an economist, who described it as the result of intellectual action activity rather than just knowledge, creating value in the old economy as a new asset [3]. Another researcher developed the concept of “human asset” in several studies in the 1970s to refer to people who participate in companies [4].

In addition, the current paper contributes to the current body of knowledge by providing a detailed bibliometric analysis of intellectual capital research limited to the papers

published in the Scopus database. However, the current analysis is considered to be one of a kind compared to past studies in the same field. Although several studies have been conducted in the field of intellectual capital, there are limited papers analyzing the scientific publications from a global perspective exclusively in the Scopus database. Past studies have discussed limited bibliometric analysis in the field of intellectual capital, focusing only on the intellectual capital aspect without including other factors. There has been a past study on intellectual capital and knowledge management which conducted a bibliometric analysis using the Scopus database from 1997–2016 [5]. Intellectual capital was not the central theme, since the authors considered it a part of the discussion alongside knowledge management. Likewise, [6] carried out a bibliometric analysis using the Scopus database (1956–2020) while treating intellectual capital as a secondary study focus besides performance. On the other hand, [7] specifically concentrated on intellectual capital; however, the study was limited to the Journal of Intellectual Capital (JIC). At the same time, several other bibliometric studies rely on different sources to Scopus, such as WOS, McMaster World Congress, and JIC [1,6–9]. Even though WoS and Scopus databases have a lot of overlap, Scopus is the most comprehensive abstract and citation database for peer-reviewed literature across a wide variety of fields. They are closely associated with each other [10,11]. Hence, the present study uses the Scopus database to cover as many studies as possible that might not be included in WoS or covered by prior research [12] to explore the history and trends of intellectual capital by addressing the following research questions:

1. What are the distribution patterns of articles in the intellectual capital area?
2. What are the contributions of well-known scholars, leading nations, and the most active academic institutions?
3. What are the frequent terms and research areas?
4. What country has dominance based on major applications?

The remainder of this paper is structured as follows. Section 2 describes the literature review. Section 3 describes the research methodology, while Section 4 presents the data analysis. Section 5 highlights the findings and discussions surrounding the key results followed by the last section, Section 6, which provides the conclusion and trends.

2. Literature Review

The notion of so-called intellectual capital was introduced by various scholars in their literary studies [13–16], wherein the perspectives of non-tangible assets contributing to organisational success were discussed. Furthermore, successive models related to the improvement of non-tangible assets were developed by [17,18], in which a process model was established, based on a strategic perspective. Since then, numerous studies have been carried out concerning the development of intellectual capital. These investigations have mainly focused on financial and accounting practices wherein the variables, structures, and measures were analysed to determine the organisational dimensions [19]. Over the years, researchers have started extrapolating the primary conceptual levels of organisational non-tangible assets [20]. Many studies in the literature report different approaches to identifying, classifying and measuring intellectual capital [8,21,22]. Some investigations have been conducted to define intellectual capital and its underlying concepts. The authors in [23,24] defined intellectual capital as the expertise, knowledge and relation of the soft assets in organisations as a substitute for their physical capital. Conversely, [25] defined intellectual capital as the knowledge of human resources of the organisation that can be used for money-making, or other useful purposes, like providing a competitive advantage.

Intellectual capital is considered an intangible asset or informational resource of an organisation that can be used at its disposal for making profits, attracting customers, creating new products, enhancing existing products or improving the business [26–28]. In essence, intellectual capital is viewed as the aggregate sum of the knowledge or set of intangible assets that can be utilized by organisations to improve their operational performance [29–32]. Concisely, it is a multidimensional concept that includes the assets of experience, knowledge and practical abilities for creating value in an organisation [33].

Intellectual capital can be perceived as a non-monetary and non-physical resource that enables organisational development by extracting knowledge-based values from the organisation [34–37]. The knowledge held by the employee of the organisation is also called the development of its business processes, databases, systems and relationships. Some studies examined the effects of intellectual capital on organisational performance [38]. Additionally, many studies have described and explained all the underlying components of intellectual capital, presenting a basis for understanding its actual meaning [39]. Yet again, [40,41] defined intellectual capital as including wisdom, innovations and knowledge. The management, creation, measurement, and evaluation of core intellectual capital are the essential indicators that determine the values of corporate competitiveness [34].

Previous studies involving intellectual resources have focused on three major factors: intangible assets, dynamic capabilities for creating and modifying the assets, and social relationships, within which all knowledge developments are established [42,43]. Each of these approaches indicated a different concept of knowledge that could be used in the organisational context [44]. When knowledge is regarded as an intangible asset, it represents a property or possession of an organisation, including investments, intellectual property rights, and human, structural, and relational capital. In economies dominated by service industries, the less value-relevant intellectual property reflects wrongly-valued organisations [45]. Following earlier suggestions, the current study focused on four dominant components of intellectual capital: human, structural, relational, and social capital [46]. Intellectual capital gains showed a three-fold advantage affected by human, structural and relational capital of the organisation [47,48]. Thus, it is important to put a clear distinction between human capital and other intellectual components. This procedure refers to strategies using the available staff resources at the respective workplace, whereas structural capital refers to the implementation of technology while managing human knowledge [49].

Based on the abovementioned factors, human capital is considered as the first construct of intellectual capital because it is the most important and biggest intangible asset in any organisation [50,51]. It includes all the processes related to the education, training and various career plans of individuals that can improve their skills, knowledge, abilities, social assets and values [52]. In addition, the second construct of structural capital was another aspect of the intellectual property that can be described as the non-human knowledge reserve in any organisation, including the information systems contributing to human capital development [53]. This construct encapsulates process instructions, databases, organisational strategies, charts and similar other tools that enhance organisational value compared to non-tangible assets [54]. These two capitals were most commonly deliberated in the previous study [55]. More recent attention has focused on the provision of relational and social capital, addressed to a lesser extent in the literature. Moreover, relational capital, developed with customers, suppliers and other stakeholders, can generate competitive capabilities to gain a sustainable advantage [56]. The marketing field mainly addressed customer relationships as the most significant intangible resource for gaining profits [57,58].

Under this rationale, it is significant to integrate it with the first item in order to incorporate all the specific arguments from each discipline. Otherwise, the presence of any incoherent and sporadic disputes on intellectual capital may fail to provide a comprehensive and practical insight to the practitioners for detecting and leveraging the critical knowledge-based assets of an organisation [59]. For instance, the area of accounting and finance has mainly focused on measurable resources alone, while overlooking the factor of social capital [60]. Over the past two decades, many organisations around the world have realized the necessity to develop intellectual capital, so that it has become a basic factor in 21st century modern organisations and businesses [61]. Meanwhile, intellectual capital is recognised as a key element for promoting the capital of an organisation and, thus, improving the products in a way that results in a competitive advantage [62]. Repeated studies have indicated that entrepreneurs generally have a wrong attitude towards intellectual capital, and, thus, it is necessary to prepare educational plans for managing intellectual capital and rectifying false outlooks [63]. In the current globally challenging times, for any

organisation, intellectual capital must become a process that goes beyond a routine job. As indicated by [64], the use of intellectual capital, together with innovative strategies, can bring immense benefits to organisations, provided the theoretical concept of the intellectual capital is translated into action.

The author further argued that when intellectual capital is managed effectively, it is potentially advantageous for mitigating various problems of the organisation, providing a competitive advantage [65]. Recent evidence suggests that intellectual capital is becoming increasingly important for the virtual economy worldwide [37,66]. According to different researchers, intellectual capital is the creative use of combined market strategies, intellectual property, human and intangible assets, as well as knowledge for producing the value chain [53,67,68]. In this perception, intellectual capital can be regarded as the difference between market value and organisational value [69]. The organisational process is all about how the employees of the organisation makes knowledge resources available in the workplace. Conversely, information systems refer to the proper use of information technology for managing acquired knowledge [70,71]. In addition, a trend analysis of these studies to discover areas of focus in this current dispensation would be an added advantage to the body of knowledge.

3. Methodology

Research trends in a certain topic can be determined by utilizing the output of a scholarly articles' repository through a bibliometric analysis study. An article that conducts bibliometric analysis, as distinguished from a review paper, has the primary goal of bringing attention to the most recent advancements, challenges, and potential future orientations of a certain issue. This study aims to provide a broader overview of several journals in the intellectual capital field from 1956 to 2020. To this end, this paper is an effort to trace the development of scientific activities as identified by authors who have published in the journals under the Scopus database to identify new research gaps. Prior studies state that the quantitative approach is concerned with analysis based on researchers' interpretations, which often suffer from cognitive bias and rely on researchers' interpretations and expertise [72].

To address our research area, we use bibliometric methodologies to take a quantitative approach. A bibliometric analysis collects and assesses quantitative bibliographic data produced from scientific publications [1]. Moreover, a bibliometric analysis provides a descriptive measurement of the primary authors published in a particular journal, the number of citations from that journal and others, and the most crucial topic. In addition, it includes a co-citation analysis [73]. The significance of this analysis is explained by the fact that the assessment of the citation trend enables us to understand the connection of the area of interest with other research disciplines [74].

3.1. Data Source and Search Strategy

Journal articles on intellectual capital in higher education firms were retrieved on 14 November 2021, primarily from the Scopus database using the following search equation in a generic approach: TITLE-ABS ("intellectual capital") AND (TITLE ("recent" OR progress OR review OR critical OR revisit OR advance * OR highlight OR perspective OR prospect OR trends OR bibliometric OR scientometric OR insights OR overview OR "state of the art" OR challenges OR updates) OR ABS (progress OR review OR bibliometric OR scientometric)) AND (LIMIT-TO (SRCTYPE, "j") OR LIMIT-TO (SRCTYPE, "p")) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp")) AND (EXCLUDE (PUBYEAR, 2022) OR EXCLUDE (PUBYEAR, 2021)) AND (LIMIT-TO (LANGUAGE, "English"). As indicated in [16], it is a significant data source for obtaining scientific articles in the modern era utilizing particular keywords and quantitative data from publications and journals. The Bibliometric study revealed the most important subjects throughout time. Figure 1 displays the roadmap of the bibliometric analysis.

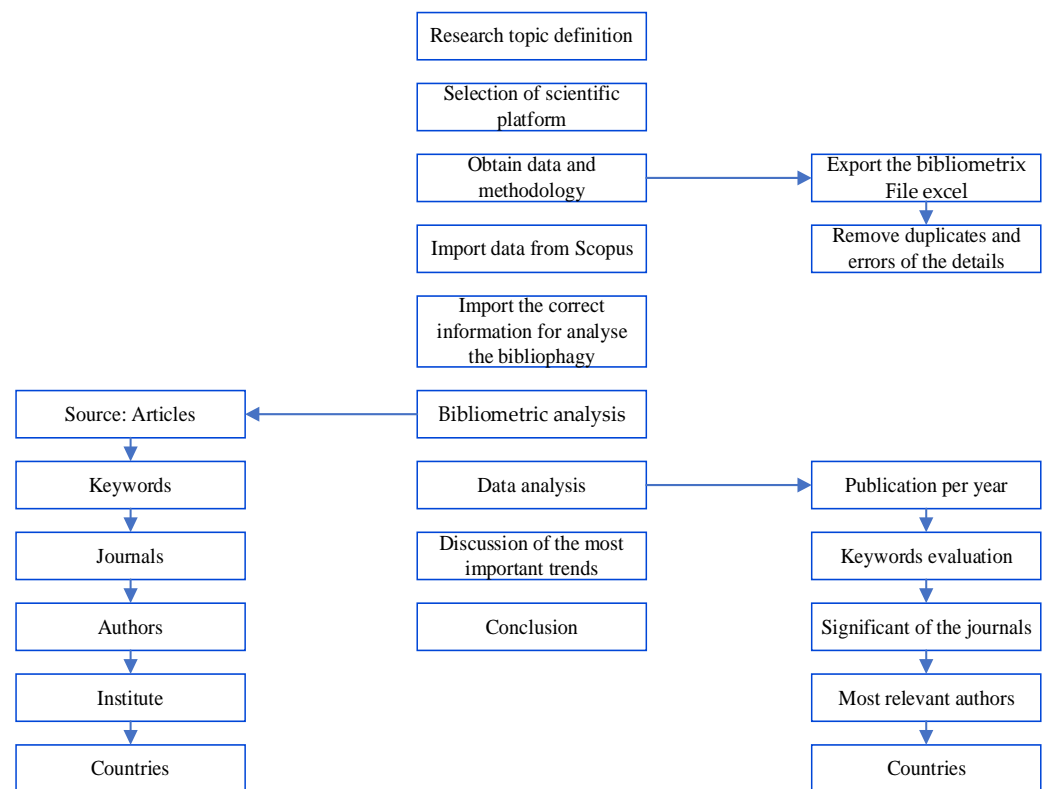


Figure 1. Workflow of the bibliometric analysis obtained from [75,76].

3.2. Bibliometric Maps

VOSviewer has been used to explore the bibliographical and author keywords in forming 638 articles. Moreover, researchers develop maps for the study items using VOSviewer as well. An item of interest to the study is a country or author's keywords. A strong connection can occur between any two items. Each link has a strength, represented by a positive numerical value—the higher this value, the stronger the association. The total link strength represents the full strength of a particular country's co-authorship linkages with other nations. In contrast, the number of papers co-authored by two nations related with each other is reflected in the strength of the relationship between them. An author's keyword link strength reveals how often articles contain two keywords that appear together in a co-occurrence analysis.

3.2.1. Co-Authorship Assessment

Among the 1331 researchers, 89 nations were included in the study of co-authorship. Africa, America, Asia, Europe, and Oceania were the five continents to which the member nations belonged.

3.2.2. Co-Occurrence Assessment

The assessment of author keyword co-occurrence (not Scopus-indexed terms) included 1521 keywords from 638 articles published in 160 journals. Synonymic single words and congeneric phrases were examined prior to loading the list of author keywords into VOS viewer. The minimum number of occurrences of a term to be examined in VOS viewer was set to five. To display the average publication year, number of occurrences, and link strength of the keywords, the overlay viewing method was selected. The hue of a term represents the average publication year of the texts in which it appears.

3.2.3. Intellectual Capital Application

Search output patterns were compared between the major topic (keyword co-occurrences) and the sub-theme (total publication). Keywords like "intangible assets", "knowledge man-

agement”, and “human capital” were all counted and displayed in VOS viewer software when it came to assessing the deployment of intellectual capital. In addition, we evaluated the five nations with the most publications for every intellectual capital usage.

4. Data Analysis

As shown in Table 1, which demonstrates that the vast majority of articles published in the social sciences were analysed, whereas only a small number of articles were reviewed in the biological and physical sciences, such as energy and computer sciences and environmental sciences. To the best of our knowledge, this is the first time that a high portion of researchers in the physical and life sciences have been taken into account. For example, the lowest number of publications was 7 in psychology, while 10 articles were in arts and humanities and 12 were in environmental science. There was a total of 236 articles in business, management, and accounting, for example, that were published in the social sciences. A total of 134 publications in the field of social sciences, energy and economics, econometrics, and finance had a combined 128 and 48. Once it comes to discussing an organisation’s increase in intellectual capital, there is a lack of reliance on theories from other fields. Several articles have been assigned to more than one category and, therefore, the overall number of papers did not add up to the subject categories.

Table 1. Distribution of scientific literature by subject category.

Subject Area	Number of Articles
Business, Management, and Accounting	236
Economics, Econometrics, and Finance	48
Social Sciences	134
Arts and Humanities	10
Energy	128
Environmental Science	12
Decision Sciences	63
Psychology	7

4.1. Publication Output and Growth of Research Interest

For 64 years, a total of 638 research articles were published (see Figure 2). As of 1956 [77], the first known publishing date, no more publications were noted until 1974. From 2003 to 2004, it is believed that intellectual capital research became a hot topic. The overall number of publications increased from six in 2003 to ten in 2004, as did public interest, since there was a total of twenty publications in 2004. Although the annual growth rate (AGR) climbed by 90% in 2000, it more than doubled between 2004 and 2005. The results show that the number of publications in the intellectual capital field have fluctuated between 30 and 60 publications over the past ten years while increasing from 42 to 69 in 2019 and 2020, respectively. Therefore, it is anticipated that the annual publication will continue to rise. However, most publications were closed access and not available to anyone in the Scopus database. As of 2020, only 38% (246 articles) were published as open-type. Thus, the citation score will automatically increase once access to journals opens. Results also showed that the articles used in this study were published in 8 different languages. The present research limited its search to the articles published in English, which is the most commonly used language. Nonetheless, the Spanish language is considered the second most common language used in the intellectual capital field but with a minimal number of publications (5 articles). When a publisher submits an article in a foreign language to be indexed in Scopus, the article should have a title and abstract in English. Figure 2 displays the annual and a cumulative number of research articles in Intellectual Capital indexed in Scopus from 1956 to 2020.

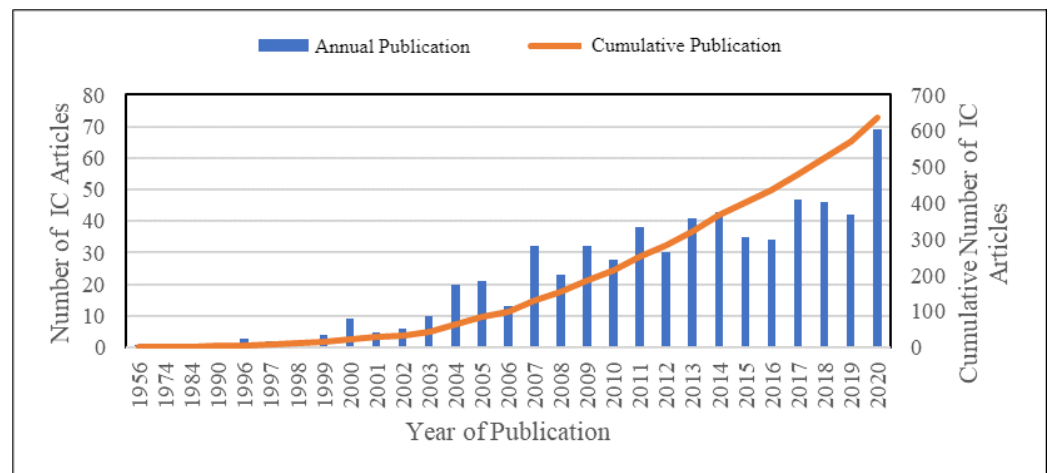


Figure 2. The annual and a cumulative number of research articles in intellectual capital indexed in Scopus from 1956 to 2020.

4.2. Preferred Journals

Questionnaire survey-based study was coded by assigning specific numerical values for the current bibliometric paper to illustrate the five (5) most productive journals in Scopus data for the intellectual capital field (see Figure 3), owned by eight (8) different publishers (see Appendix A). Emerald and Inderscience published the first three productive journals. In contrast, the rest were published under Elsevier, Taylor & Francis, World Scientific, Multidisciplinary Digital Publishing Institute (MDPI), Primrose Hall Publishing Group, and Wiley-Blackwell. The journal with the highest total publication was the Journal of Intellectual Capital (intellectual capital) with 88 articles, followed by the International Journal of Learning and Intellectual Capital with 17 articles, the Journal of Knowledge Management with 14 total publications. International Journal of Management Reviews had the highest cited score with 20.8 and a total publication of 4 articles. However, the Journal of Knowledge Management Journal of intellectual capital has the most cited paper with 361 citations. Moreover, Appendix A has been provided for the more productive journal in the intellectual capital area, ranking the journals for the top fifteen (15) productive journals.

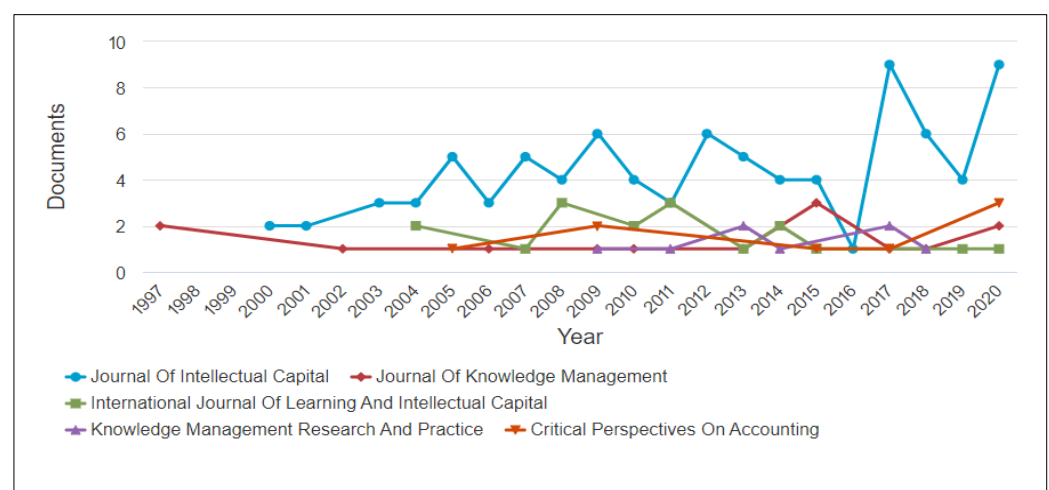


Figure 3. The top five most productive journals in intellectual capital research.

On the other hand, based on the cited score in the 2020 report, seven (7) out of fifteen (15) journals had a CiteScore of 5 and above. Journals with the highest and lowest CiteScore were the International Journal of Management Reviews (20.8), and the International Journal of Innovation Creativity and Change (0.5), respectively. Despite the rank of two in number of total publications, the International Journal of Learning and Intellectual Capital was significantly lower than other journals, scoring only 2.2 CiteScore. According to the Scopus-Elsevier Cite Score, the Clarivate publisher's impact factor may be calculated using citation data from the Scopus database. Recently, researchers considered CiteScore one of the main factors influencing their publication choice. The current study provided the most-cited journal in intellectual capital, with 25 journals (Appendix B). The researchers noted that the highest journals in terms of CiteScore were under Wiley-Blackwell, Elsevier, and Emerald publishers (Appendix B). Figure 3 presents the top 5 most productive journals in intellectual capital research.

4.3. Partnerships, Top Nations, and Elite Institutes

The present study showed that the top 15 countries contributed to the growth of intellectual capital studies globally. About 23% of global publications were contributed by the United Kingdom and Italy, indicating these two countries are key players in the progress of intellectual capital research. With 45 publications, the UK was the most productive country. Italy was the second most fruitful country. However, the total publications (TPi) from Universiti Degli Studi di Napoli Federico II were slightly lower than that of Cranfield School of Management in the United Kingdom, with 7 and 4 publications, respectively. Figure 4 lists the most productive institutes in each country, based on the number of publications in the intellectual capital area; the present study also illustrates the most productive institutes in the area of intellectual capital ranked from 1 to 20, with the total number of publications shown in Appendix C. Figure 3 shows that only Romania (90.5%), Finland (89.5%), Taiwan (81.1%), India (77.3%), Poland (76.5%), Portugal (75.9%), the United States (73.7%), and Malaysia (70.3%) had more than 2/3 single-country publications (SCPs). This indicates that these countries have a high level of intra-country cooperation. However, the United Kingdom was the nation with the lowest SCP with 53.6 percent, where 39 out of 84 articles were related to numerous connections. That signifies that United Kingdom publications were internationally collaborative papers, linked with more than 20 nations, and it was rated the first most active country in international collaborative studies. Figure 4 shows the top fifteen most productive countries and academic institutions in intellectual capital publications.

Therefore, the most productive institution worldwide in intellectual capital research was McMaster University, ranked as the top institution with (19) publications. The following two institutes were assigned to two universities in Australia: Macquarie's and the University of Sydney, as the second and third most productive institutes with (19) and (13) publications, respectively. Moreover, this was followed by Cranfield School of Management in the United Kingdom with 13 publications, ranking fourth. Bucharest University of Economic Studies in Romania scored fifth ranking with a total publication of 11, followed by Macquarie's Business School in Australia with (11) publications. However, the remaining detailed information regarding the most productive institutes in the intellectual capital field are explained in Appendix D.

Five cooperation networks were observed (green, red, purple, blue, and green), and the associated countries/territories were aggregated into five continents, with the North American continent being the most important (UK, Italy, USA, Australia, and Spain), see in Figure 5. This demonstrates that intellectual capital has been investigated by significant nations, highlighting the significance of researching the subject's facets in institutions and colleges throughout the world. Figure 6 depicts collaborative networks by country of publishing.

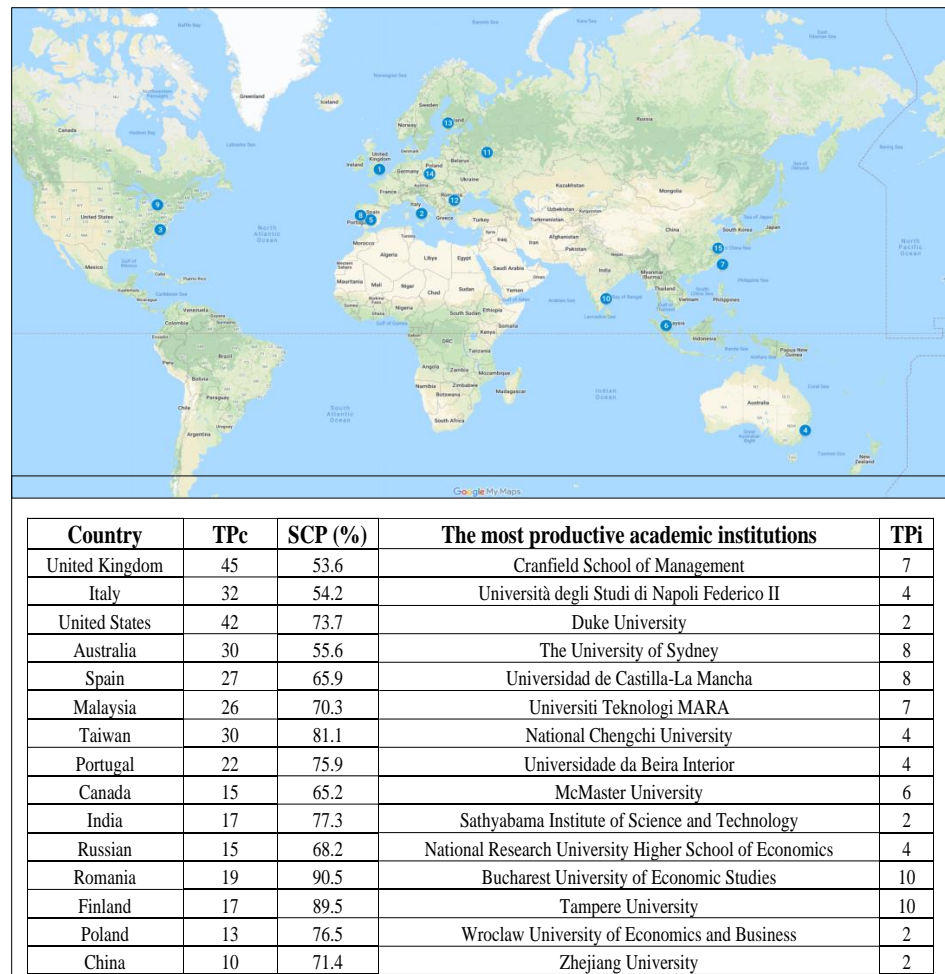


Figure 4. The top fifteen nations and academic institutions in terms of intellectual capital publishing output. Note: TPc: Total Publications of a given Country; TPi: Total Publications of a given academic In-situation; SCP: Single-Country Publications.

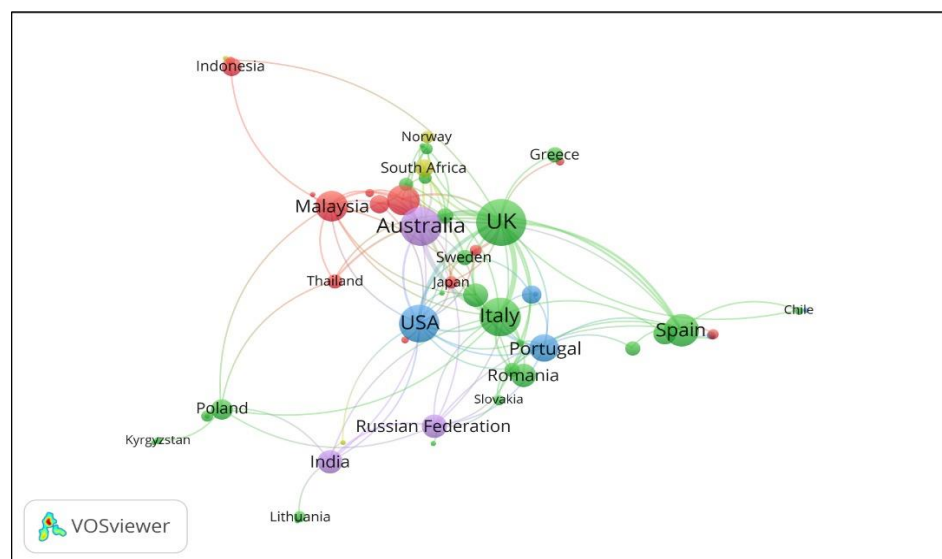


Figure 5. The screenshot of the bibliometric map created based on countries' publications with network visualization mode. as shown in Figure 5 and the following link: <https://bit.ly/30p7K7C/> accessed on 12 June 2022.

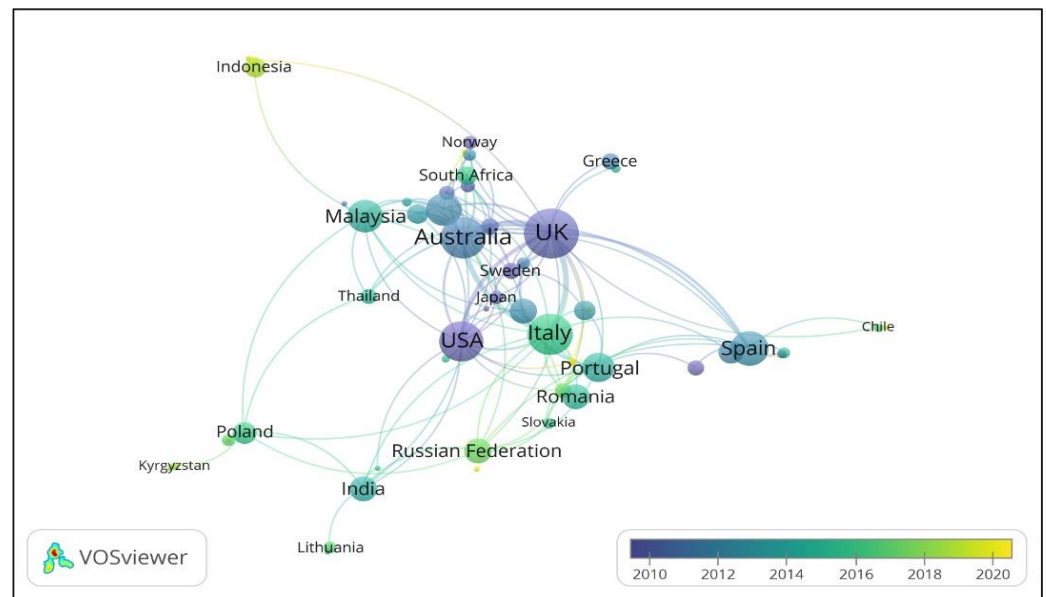


Figure 6. An example of the bibliometric map built in network visualisation mode based on the year of publication of nations, as shown in Figure 6 and the following link <https://bit.ly/3CnlxsF/> accessed on 12 June 2022.

Figure 6 illustrates the collaboration networks between countries' year of publication from 2010 to 2020. Five collaboration networks were observed (purple, green, and yellow), the most important being the UK, Italy, Australia, and the USA. This shows that the subject of intellectual capital has been studied by relevant countries, which reveals the importance of analyzing the subject's aspects in institutions and universities worldwide.

Additionally, Figure 7 validates that there were six collaboration networks (yellow, red, purple; blue; light blue; and green) between nations' citations (the most important being the United States, the United Kingdom, Spain, and Italy). Intellectual capital was examined by relevant countries, demonstrating the relevance of investigating its many elements in educational institutions and universities all over the world.

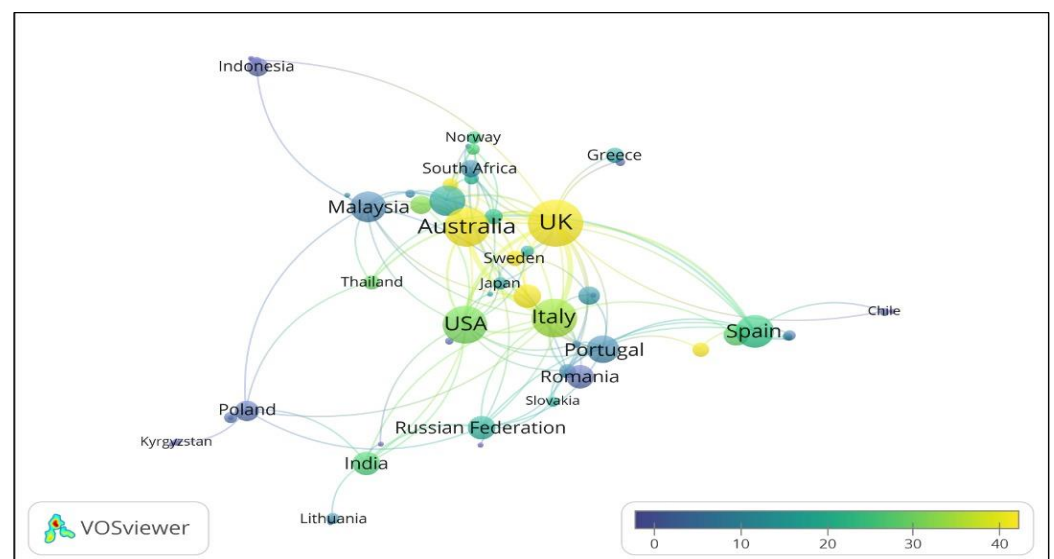


Figure 7. A screenshot of the bibliometric map created based on countries' citations with network visualization mode. The following URL can be used to open Figure 7 in VOSviewer: <https://bit.ly/3CnlxsF/> accessed on 12 June 2022.

4.4. Influential Writers

Figure 8 outlines the 15 most prolific intellectual capital authors from nine nations, including Australia (4 authors), Canada (2 authors), Italy (2 authors), Portugal (2 authors), Denmark, Taiwan, United Kingdom (Sweden), Sweden (Taiwan), and Finland (1 author). The most prolific publisher has published works between 1999 and 2020. The authors' affiliations show that intellectual capital research has been within fields related to intangible resources, business, and management. John Dumay from Australia has the highest publication in the intellectual capital field with 17 total publications from 2017 to 2020, 14 h-index, and 1633 citation times. Moreover, the second-highest author was Nick Bontis from Canada, affiliated with McMaster University of Hamilton, Canada, with total publications of 10 and 1242 citation times. The third and fourth authors were from Australia and affiliated with different universities with citations of 666 and 981, respectively. The authors of the most cited papers in Appendix A may not appear in Appendix C, which lists the most frequently cited articles. If they had published a lot, such as Guthrie, J., Abeysekera, I., and Marr, B., their names would appear in both tables. See Appendix C for more details about the top fifteen most productive authors in intellectual capital research.

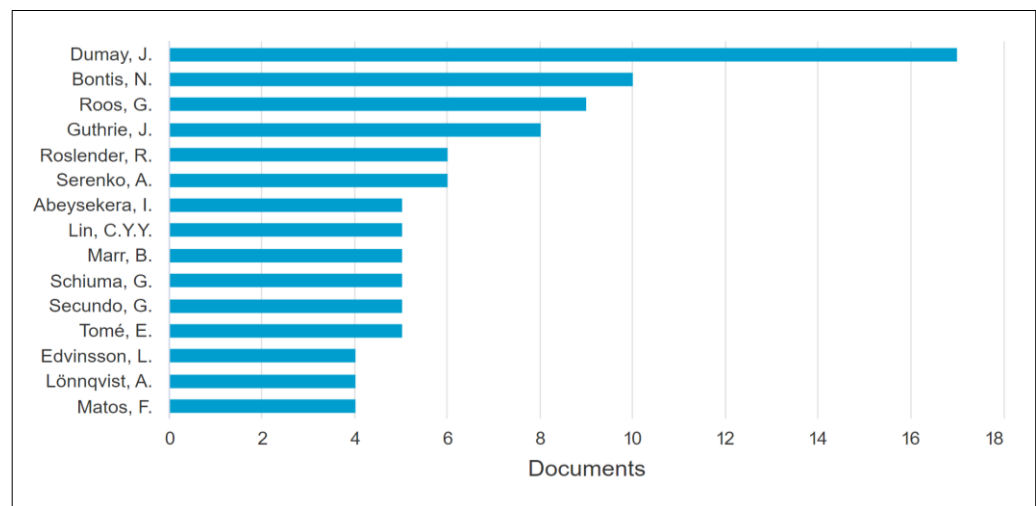


Figure 8. The top fifteen most productive authors on intellectual capital research.

4.5. Keywords

It was found that 3425 (44.4%) of the 1521 author keywords were used just once, while 342 (10.0%) were used twice, and 116 (3.0%) were used three times. Seventy-two keywords fulfilled the threshold of at least five appearances in the VOS viewer after being relabeled as synonymic single words and congeneric phrases.

Lexicon and Terminology

The term occurring most often in our research was 'intellectual capital', with 351 occurrences and 1447 linkages to other keywords (see Figure 9). Additionally, we noticed the use of broad phrases, such as 'knowledge management' (85 occurrences, 330 links) and 'human capital' (49 occurrences, 226 links). Intellectual capital co-occurred with conceptual keywords, including 'innovation', 'performance', and 'knowledge'.

With 351 occurrences and 1447 connections to other keywords, 'intellectual capital' is the most often used key-word (see Figure 10). There was also a lot of discussion about "knowledge management", "human capital", and "intangible assets", which we found to be common phrases (35 occurrences, 178 links). The terms "innovation", "performance", "knowledge", and "relational capital" are all synonyms for "intellectual capital". In addition, we found that the intellectual capital name had references to various aspects, including substrate, social capital, and structural capital. Some examples of intellectual capital con-

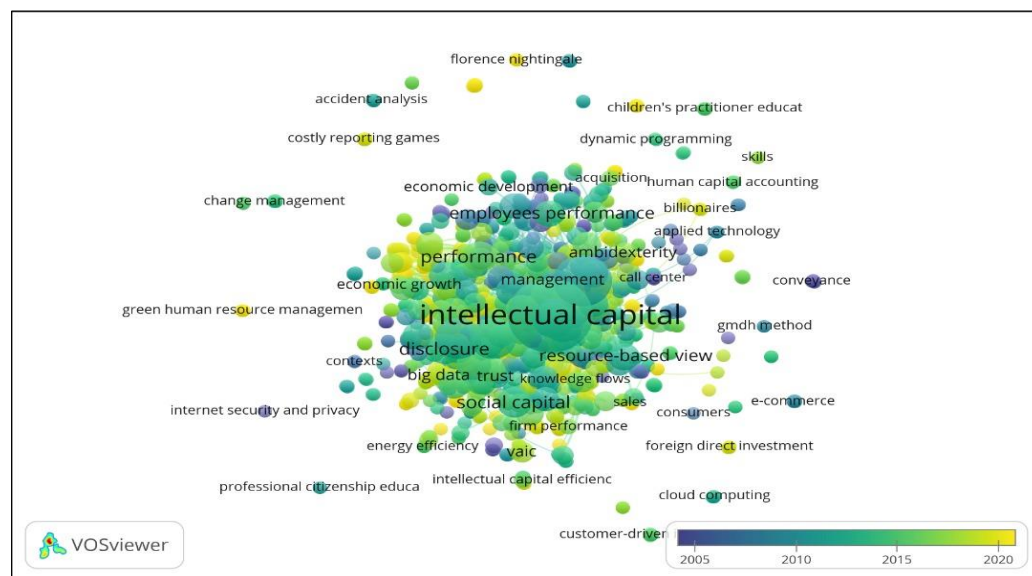


Figure 11. A screenshot of the bibliometric map created based on author keywords co-occurrence per year publication with network visualization mode: <https://bit.ly/3Dp5jRg/> accessed on 12 June 2022.

5. Discussion

Using a bibliometric approach, this study examined the available literature on intellectual capital, identifying research trends and outlining a research agenda for upcoming decades. With the use of a comprehensive quantitative research approach, it expands our knowledge and contributes to earlier literature in intellectual capital. According to the findings, published field research on countermeasures to intellectual capital began in the mid-1950s and continued until the mid-2020s. A steady growth in the number of publications has occurred over the past four years, although it cannot be claimed to be at its pinnacle. If there is no compromise on the financial sector, therefore, this lack of study relating to intellectual capital may be due to the dominant perspective of businesses in accounting and business research that the goal of finance is to generate value [59].

Firms that actually admit intellectual capital qualifications are perceived by the public as not engaging in competitive advantage, an allegation that is contradictory to what really occurs [78]. According to the Global Reporting Initiative (GRI), more organisations are disclosing information in order to gain credibility [79]. Research on intellectual capital will continue to gain traction in the coming years as a result of this growth. Over 89% of these articles originate from developed countries, leaving developing countries, particularly those in Africa and elsewhere, under-researched. It is clear that the United States, Canada, the United Kingdom, and Australia are the most prominent countries in terms of publications based on national co-authorship findings. However, a reference (author) co-citation analysis shows that overseas cooperation with other rising nations is non-existent in the period studied.

Since intellectual capital disclosures are increasing, these findings imply that the conversation around it has not spread beyond national borders and that it may be used to help develop solutions. In addition, this study looked at the link between leading intellectual capital researchers and the nations that fund their work. Some, if not all, of the leading researcher avoiding intellectual capital appear to operate in isolation, as evidenced by the small number of overall link strengths in the country and document co-citation analyses. Research partnerships are critical if the negative consequences of tax evasion are to be revealed. Increasing numbers of academics have demonstrated a connection between intellectual capital and productivity growth [80].

Mixed journal co-citation clusters, on the other hand, show the underlying pluralistic research tendencies and multidisciplinary character of intellectual capital research. Scholars in a wide range of fields, such as the social sciences, decision sciences and psychology,

have documented the importance of intellectual capital in their work. Intellectual capital research is not restricted to the “economic, legal, ethical, and discretionary” ambitions of society, as this evidence demonstrates [81]. Analyzing intellectual capital may be useful in a variety of journals, each with its own style and audience. Even though there are just a few publications in this field, this research shows that intellectual capital is becoming more prevalent with time. An investigation of authors’ co-authorship networks reveals that researchers at the centre of clusters play an important role in knowledge production by attempting to link business income taxes with intellectual capital activities.

International collaborations are bolstered by well-known and well-respected researchers, as well [1]. Some ideas have been used to explain intellectual capital based on a keyword analysis of text data from subjects and abstracts. A few examples of these ideas are: organisational hypocrisy (also known as an “organisational façade”), the legitimacy of corporations, corporate culture and ethics, and strategic trade-offs, to name just a few. Researchers can use the results to expand their understanding of intellectual capital by looking into areas like corporate tax avoidance and the influence of gender diversity on intellectual capital. They can also look into other theories or perspectives not previously considered in intellectual capital research.

There were several sub-topics revealed through the cluster analysis of the text data using VOSviewer: intellectual capital, sustainability and corporate inversion, early policy initiatives and propensity score matching (PSM). It is important to note that the PSM method pairs test and control samples, such as intellectual capital entities and non-intellectual capital entities. Consequently, the discrepancies between intellectual capital can be credited to the firm’s intellectual capital strategic plan, and not to the firm’s attribute perspectives to integrated reporting with intellectual capital, empirical assessment of early policy initiative and governance on intellectual capital disclosure and organisations, ethics and society. Analysis of publication channels shows that intellectual capital is seen as a problem of both long-term sustainability as well as ethics [82].

6. Conclusions and Trends

The current paper provided a summary of the trend and development of intellectual capital studies based on 683 articles under the Scopus database. The study presented an overview of the most productive countries/institutes with strong international collaboration (the United Kingdom and Italy) and the most active authors (Dumay and Bontis). The current paper also discussed several aspects, such as co-authorship, co-occurrence analysis, and author keywords. This study utilised bibliometric analysis to examine the scientific publications linked to intellectual capital through time, utilising extensive analysis of data and visualisations. Since 2015, research on this topic has been increasing at a rapid rate, according to this report. The statistical findings of the datasets show that the United States, the United Kingdom, Spain, and many other nations have made major contributions to this study area. Intellectual capital has been studied and has grown in many ways during the past 74 years, as evidenced by an examination of the keywords. Keyword study shows that intellectual capital has not diminished over time. Published studies have a direct impact on intellectual capital. As a result, it may be said that the more authors there are, the more publications there will be, and vice versa.

Using a bibliometric approach that relies on the Scopus database, this study contributes to existing literature by reviewing the history and evolution of intellectual capital research. This could lead to the identification of the aspects of the core principle, models, and trends in intellectual capital. Moreover, this study offers insight into the amount of progress the studies have undertaken chronologically, the congruence of keywords through clusters, significant journals, institutions, nations, and scientific partnerships in this field. In the same vein, from a practical outlook, this paper offers a guideline for companies in formulating and executing strategies in favor of intellectual capital development. Knowledge about the trends and historical development of intellectual capital research is instrumental for organisations, executives, and practitioners in identifying the areas they can rely on to achieve a competitive

advantage, the bottom line for all managers. From a theoretical viewpoint, this paper has made a noticeable contribution to the field of intellectual capital where a bibliometric analysis has been addressed to overcome the past studies' gaps in the same area.

In this research, only Scopus was used as the major database. Scientific output, knowledge creation, and innovation can all be studied in relation to intellectual capital in future studies. Most present studies only consider the three primary components of intellectual capital: human capital, structural capital, and relational capital. Moreover, the present study is limited to the "intellectual capital" field within titles and abstracts. The results of this paper might not cover all intellectual capital studies under the Scopus database since a few researchers did not mention, or refer to, the intellectual capital term in their studies, using different words instead, such as intangible resources or assets. The present study suggests that future research consider other databases, such as WOS. Further, future studies could conduct a comparative study between two databases, like Scopus and WOS. Further recommendation for future research is to narrow down the scope of this study by focusing on the trend of intellectual capital in the last two decades or analysing a particular journal, such as journal of intellectual capital.

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Appendix A

Table A1. The top 15 most productive journals on intellectual capital research with their most cited article.

Rank	Journal	Total Publication	CiteScore 2020	SJR	SNIP	Percentile	Quartile	Title of the Most Cited Article	Times Cited	FWCI	PlumX (Social Media)	Publisher
1	Journal of Intellectual Capital	88	9.2	1.258	2.428	99th	Q1	Measuring intellectual capital: A new model and empirical study [83]	361	10.47	508	Emerald
2	International Journal of Learning and Intellectual Capital	17	2.2	0.316	0.792	51st	Q2	Effect of intellectual capital on competitive advantage and business performance: Role of innovation and learning culture [84]	27	0.49	101	Inderscience Publishers
3	Journal Of Knowledge Management	14	10.3	1.841	2.520	96th	Q1	Knowledge Management: An Introduction and Perspective [85]	361	2.58	741	Emerald
4	Critical Perspectives on Accounting	8	6.6	2.042	2.261	97th	Q1	An empirical investigation of annual reporting trends of intellectual capital in Sri Lanka [86]	232	4.88	223	Elsevier

Table A1. Cont.

Rank	Journal	Total Publication	CiteScore 2020	SJR	SNIP	Percentile	Quartile	Title of the Most Cited Article	Times Cited	FWCI	PlumX (Social Media)	Publisher
5	Knowledge Management Research and Practice	8	4.3	0.516	1.246	88th	Q1	An intellectual capital perspective of human resource strategies and practices [87]	80	3.1	150	Taylor & Francis
6	International Journal of Knowledge Based Development	7	2.1	0.261	0.577	56th	Q2	Facilitating growth and technology spaces through place-making: lessons learned from European quality standards [88]	57	2.72	62	Inderscience Publishers
7	Management Decision	6	5.5	0.923	1.358	90th	Q1	Defining intellectual capital: A three-dimensional approach [89]	55	1.13	60	Emerald
8	Measuring Business Excellence	6	2.5	0.341	0.807	62th	Q2	The development and implementation of a university-based Balanced Scorecard [90]	25	2.04	315	Emerald
9	Accounting Forum	5	4.6	0.942	1.410	88th	Q1	Integrated reporting: A structured literature review [91]	252	20.43	74	Elsevier
10	Journal of Information and Knowledge Management	5	1.5	0.236	0.592	61st	Q2	Impact of relational capital on business value [92]	8	0.17	36	World Scientific
11	Meditari Accountancy Research	5	5.2	0.659	1.072	88th	Q1	Breaching intellectual capital: critical reflections on Big Data security [93]	61	2.17	124	Emerald
12	Sustainability Switzerland	5	3.9	0.612	1.242	84th	Q1	In order to meet the 4.0 challenges of the industry, external collaborations in employee learning and support are essential [94]	50	6.03	246	Multidisciplinary Digital Publishing Institute (MDPI)
13	International Journal of Innovation Creativity and Change	4	0.5	0.225	0.231	28th	Q3	The constructionalisation of intellectual capital based on the industrial revolution 4.0: A meta-analysis [95]	1	0.48	15	Primrose Hall Publishing Group
14	International Journal of Management Reviews	4	20.8	4.475	5.548	99th	Q1	Mechanisms for managing ambidexterity: A review and research agenda [96]	263	9.26	665	Wiley-Blackwell
15	Learning Organization	4	5.1	0.718	1.715	93rd	Q1	A critical review of knowledge management models [97]	190	4.55	408	Emerald

Appendix B

Table A2. The top CiteScore journals publishing intellectual capital research with minimum 3 research articles.

Rank	Journal	CiteScore 2020	Journal's Homepage	Publisher	No. of Publications
1	International Journal of Management Reviews	20.8	https://onlinelibrary.wiley.com/journal/14682370/ accessed on 12 June 2022	Wiley-Blackwell	4
2	International Journal of Information Management	18.1	https://www.sciencedirect-com.ezproxy.utm.my/journal/international-journal-of-information-management/ accessed on 12 June 2022	Elsevier	3

Table A2. Cont.

Rank	Journal	CiteScore 2020	Journal's Homepage	Publisher	No. of Publications
3	Technovation	10.4	https://www-sciencedirect-com.ezproxy.utm.my/journal/technovation/ accessed on 12 June 2022	Elsevier	3
4	Journal of Knowledge Management	10.3	https://www.emeraldgroupublishing.com/journal/jkm?id=JKM/ accessed on 12 June 2022	Emerald	14
5	Journal Of Intellectual Capital	9.2	https://www.emeraldgroupublishing.com/journal/jic?id=JIC/ accessed on 12 June 2022	Emerald	88
6	International Journal of Human Resource Management	6.9	https://www-tandfonline-com.ezproxy.utm.my/toc/rjh20/current/ accessed on 12 June 2022	Taylor & Francis	3
7	Critical Perspectives on Accounting	6.6	https://www-sciencedirect-com.ezproxy.utm.my/journal/critical-perspectives-on-accounting/ accessed on 12 June 2022	Elsevier	8
8	Accounting, Auditing and Accountability Journal	6.0	https://www.emeraldgroupublishing.com/journal/aaaj?id=AAAJ/ accessed on 12 June 2022	Emerald	3
9	Management Decision	5.5	https://www.emeraldgroupublishing.com/journal/md?id=MD/ accessed on 12 June 2022	Emerald	6
10	Meditari Accountancy Research	5.2	https://www-emerald-com.ezproxy.utm.my/insight/ accessed on 12 June 2022	Emerald	5
11	Learning Organization	5.1	https://www.emeraldgroupublishing.com/journal/tlo?id=TLO/ accessed on 12 June 2022	Emerald	4
12	Accounting Forum	4.6	https://www-tandfonline-com.ezproxy.utm.my/toc/racc20/current/ accessed on 12 June 2022	Elsevier	5
13	Quality And Quantity	4.6	http://www.springeronline.com/journal/11135/about accessed on 12 June 2022	Springer Nature	3
14	Knowledge Management Research and Practice	4.3	https://www-tandfonline-com.ezproxy.utm.my/toc/tkmr20/current/ accessed on 12 June 2022	Taylor & Francis	8
15	Sustainability	3.9	https://www.mdpi.com/journal/sustainability/ accessed on 12 June 2022	Multidisciplinary Digital Publishing Institute (MDPI)	5
16	Montenegrin Journal of Economics	3.0	http://www.mnje.com/en/ accessed on 12 June 2022	Economic Laboratory for Transition Research	3
17	Knowledge And Process Management	2.7	https://onlinelibrary.wiley.com/journal/10991441/ accessed on 12 June 2022	Wiley-Blackwell	3
18	Amphitheatre Economic	2.6	https://portal.issn.org/resource/ISSN/1582-9146/ accessed on 12 June 2022	Editura ASE Bucuresti	3
19	Measuring Business Excellence	2.5	https://www.emeraldgroupublishing.com/journal/mbe?id=MBE/ accessed on 12 June 2022	Emerald	6
20	International Journal of Learning and Intellectual Capital	2.2	https://www.inderscience.com/jhome.php?jcode=ijlic/ accessed on 12 June 2022	Inderscience Publishers	17
21	International Journal of Knowledge Based Development	2.1	https://portal.issn.org/resource/ISSN/2040-4468/ accessed on 12 June 2022	Inderscience Publishers	7
22	Intangible Capital	2.1	http://miar.ub.edu/issn/1697-9818/ accessed on 12 June 2022	OmniaScience	3
23	Journal of Information and Knowledge Management	1.5	https://www.worldscientific.com/worldscinet/jikm/ accessed on 12 June 2022	World Scientific	5
24	International Journal of Innovation Creativity and Change	0.5	https://www.ijicc.net/ accessed on 12 June 2022	Primrose Hall Publishing Group	4
25	International Business Management	0.2	https://www.medwelljournals.com/journalhome.php?jid=1993-5250/ accessed on 12 June 2022	Medwell	3

Appendix C

Table A3. The top 15 most prolific authors in the intellectual capital research area.

Rank	Author	Scopus Author ID	Year of 1st Publication	Total Publication	Document H-Index	Total Citation	Current Affiliation	Country
1	Dumay, John	16237803000	2017	17	14	1633	Macquarie Business School, North Ryde, Australia	Australia
2	Bontis, N.	57208463143	2017	10	9	1242	McMaster University, Hamilton, Canada	Canada
3	Roos, G.	55579721600	1999	9	7	666	The College of Business, Government and Law, Adelaide, Australia	Australia
4	Guthrie, J.	8396129000	2005	8	6	981	Macquarie University, North Ryde, Australia	Australia
5	Roslender, R.	6603377492	2003	6	5	179	Aalborg University, Aalborg, Denmark	Denmark
6	Serenko, A.	13104570000	2004	6	6	664	Ontario Tech University, Oshawa, Canada	Canada
7	Abeysekera, I.	23395741100	2005	5	5	417	Charles Darwin University, Darwin, Australia	Australia
8	Lin, C.Y.Y.	15034960600	2009	5	4	197	National Chengchi University, Taipei, Taiwan	Taiwan
9	Marr, B.	8538051200	2003	5	4	443	Cranfield School of Management, Cranfield, United Kingdom	United Kingdom
10	Schiuma, G.	24081137800	2004	5	5	223	University Degli Studi Della Basilicata, Potenza, Italy	Italy
11	Secundo, G.	8246738300	2010	5	4	260	Universita del Salento, Lecce, Italy	Italy
12	Tomé, E.	16417657800	2005	5	2	32	Universidade de Averno, Averno, Portugal	Portugal
13	Edvinsson, L.	7202142574	1996	4	4	662	UNIC Stockholm, Sweden	Sweden
14	Lönnqvist, A.	16239164400	2009	4	4	70	Tampere University, Tampere, Finland	Finland
15	Matos, F.	55486940400	2014	4	1	2	Instituto Universitario de Lisboa ISCTE-IUL, Lisbon, Portugal	Portugal

Appendix D

Table A4. The top 25 most productive institutions in intellectual capital research.

Rank	Institute	Country	No of Publication
1	Macquarie University	Australia	19
2	The University of Sydney	Australia	13
3	Cranfield School of Management	United Kingdom	13
4	Bucharest University of Economic Studies	Romania	11
5	Macquarie Business School	Australia	11
6	Tampere University	Finland	10
7	McMaster University	Canada	10
8	Universidad de Castilla-La Mancha	Spain	9
9	Universita del Salento	Italy	9
10	DeGroote School of Business	Canada	9
11	Sapienza Università di Roma	Italy	8
12	Universiti Teknologi MARA	Malaysia	7
13	National Chengchi University	Taiwan	7
14	Cranfield University	United Kingdom	6
15	National Research University Higher School of Economics	Russian	6
16	Università degli Studi della Basilicata	Italy	6
17	Universidad Autónoma de Madrid	Spain	6
18	The University of Sydney Business School	Australia	6
19	Universitatea din Bucuresti	Romania	5
20	Universiti Utara Malaysia	Malaysia	5
21	University of Craiova	Romania	5
22	The University of Waikato	New Zealand	5
23	Hong Kong Polytechnic University	Hong Kong	5
24	international Islamic University Malaysia	Malaysia	5
25	Università della Calabria	Italy	5

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