20 Years of Intellectual Capital Research: A Bibliometric Analysis

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Abstract

Intellectual Capital (IC) study began over 20 years ago. But little mapping of this study has been done. "How many IC articles have been published and cited?" This is vital for future IC research. This study's goal is to map 20 years of IC research bibliometrically. This is significant because IC has been shown to boost company performance, competitiveness, and welfare. Bibliometric analysis is used because it is quantifiable, objective, avoids potential subjective bias, and confirms expert opinions in the field of IC. The results showed 3993 IC articles between 2000-2020. English is the most extensively used language in publications, accounting for 95.04 percent. IC and competitive advantage, IC statement, and IC perspective are the most researched themes. Nick Bontis, James Guthrie, and John Dumay are the most prolific. This study's findings will be useful to future IC researchers.

Keywords: Intellectual capital, Bibliometric, VosViewer.

INTRODUCTION

Research by Hermawan (2010) has divided the measurement of Intellectual Capital (IC) into two things, namely financial and non-financial measurements. Even in the article it is very clearly stated that non-financial measurements outperform financial measurements. Furthermore, the research of Hermawan (2013) divides IC into two, namely financial IC and non-financial IC. For financial IC, it will be related to financial performance analysis. When associated with the field of science, financial accounting and financial management are very closely related. Meanwhile, non-financial IC will be related to management and strategy, which in the end will relate to the fields of management accounting and strategic management accounting. In the practical realm, Financial IC will be used to analyze the company's financial performance while non-financial IC is used to improve
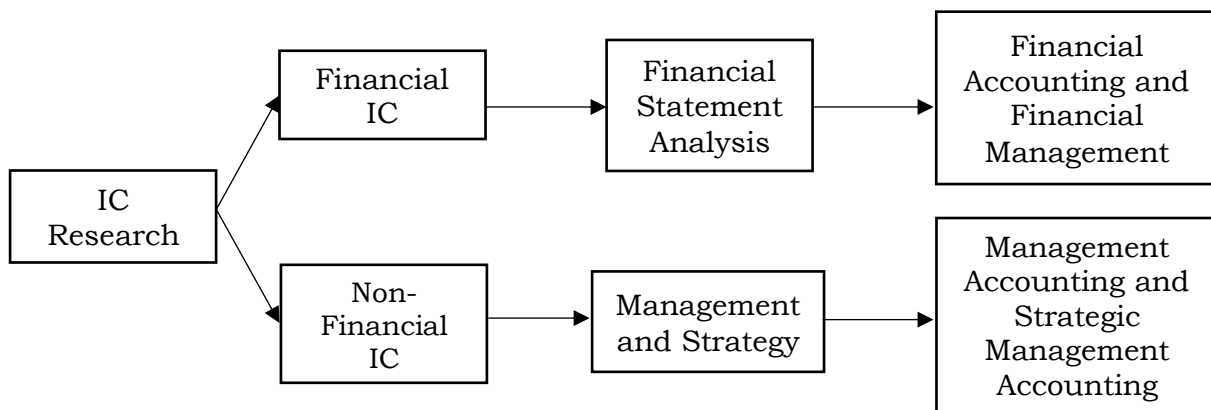
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Figure 1. Research of Financial IC and Non-Financial IC

Source: Hermawan (2013)

company performance. Figure 1 describes the division of the IC.

Meanwhile, the development of IC research to date is very rapid so that the mapping of IC research related to the field of accounting has also undergone changes not only as shown in Figure 1. For example, research of Hermawan (2013) entitled "Dirty Business Practices of the Pharmaceutical Industry in the Frame of Intellectual Capital and Teleology Theory" can be categorized into IC research related to business and professional ethics. Hermawan et al research (2019) entitled "Responses to the Implementation of Intellectual Capital Disclosure on the Website of the University of Muhammadiyah Sidoarjo" can be categorized as IC research in relation to management/accounting information systems (SIM/AIS). Thus, there are actually a lot of IC research related to

other fields of science within the accounting science family, but the results have not been dug deeper and published.

Research mapping like this can be done by bibliometric analysis. Several researchers have done this. Kasztler & Leitner (2002) research on Bibliometric Analysis and Visualization of Intellectual Capital. Analysis using BibTechMonTM. The result of his research is that the application of this method to IC reporting is a major step in improving the IC reporting system. There are many advantages and potential of using BibTechMonTM in the context of IC reporting.

Furthermore, Diaz et al (2013) research conducted an analysis of IC and public management. Bibliometric analysis tool using EndNote X6 e software. The result of his research is that there are many opportunities for research contributions to bibliometric

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analysis of intellectual capital and public management at the international level. The research suggestion is that future bibliometric analysis is developed by considering other databases and also using descriptive analysis of the research portfolio obtained.

Belluci et al. (2020) conducted an analysis of IC articles published in the Journal of Intellectual Capital (JIC) for five years starting from 2014-2018. The results of the research are that four main streams of research have emerged at JIC during the years of analysis, namely IC reporting and disclosure; IC research in universities, education and the public sector, knowledge management, IC, financial performance, and market value.

Taking into account several previous studies, the purpose of this study is to analyze intellectual capital research that has been carried out for 20 years. Some of the specific objectives of this research are to map intellectual capital research based on the year of publication, document language, number of citations, author with the highest citation, keyword analysis, and analysis by author.

LITERATURE REVIEW

The basic theory that is widely used to explain the role of intellectual capital is the Resource-Based Theory.

This theory explains that a company will be able to improve its performance and competitive advantage if it is able to optimize its assets, especially intangible assets (Wernerfelt, 1984). The inclusion of intangible assets is obtained from its ability to have all the characteristics of strategic assets. While most intangible assets do not qualify as strategic assets, IC is generally considered an important strategic asset. By having IC, it means that the company has special and valuable knowledge. The qualification of IC as a strategic asset lies in the very potential relationship between IC and firm performance(Belkaoui, 2003) Some experts have used the resources based theory as the basic theory in their research (Ifleh, Y., Lotfi, M., & Elkabbouri, 2017) Rađenović & Krstić, (2017), Kamaluddin & Rahman (2013), Hermawan & Milanetty (2018), (Hermawan, 2013).

Several experts have defined IC in many perspectives. Harrison (2000) defines IC as knowledge that can be converted into profit. According to Marr (2001), IC is a group of knowledge assets that are associated with the organization and significantly contribute to the competitive position of the organization by adding the key factors owned by the stakeholders. Meanwhile, according to Bontis (1996) IC is elusive, but once discovered and

exploited, it provides organizations with a new resource to compete and win.

Various IC research has been developed by many experts. For example, IC is associated with financial performance (Sriwahyuni, D., S Hermawan., 2019) (Xu, 2018) (Poh, Law Teck., Adem Kilicman, 2018) (Andreeva, 2107) and business performance (Hermawan, Sigit., Nurasik., Eva., Duwi Rahayu., 2020) (Cabrita, 2008), Intellectual capital can also be associated with innovation (Gansiniec, 2016) (Uziene, 2015) and competitive advantage (Januškaite, 2018) (Dahasha, 2018). Thus, based on IC research, it should be grouped into several fields related to the field of science and practical purposes. For example, research by Hermawan (2013) who can divide IC research into two fields of science, namely financial accounting and management accounting. Financial accounting can be related to the analysis of the company's financial performance. Management accounting is related to the management and strategy of maximizing company assets. When associated with courses in the accounting study program, they are financial accounting and financial management for financial IC and management accounting and strategic management courses for IC

management. There is also something that has not been widely developed and explored in IC research, namely the use of qualitative research methods and mixed methods. Because so far intellectual capital research has mostly used quantitative research methods.

METHOD

This study uses bibliometric analysis to analyze intellectual capital research for 20 years starting from 2000 -2020. The database analyzed is articles published in the Scopus journal (www.scopus.com). The keyword used is intellectual capital. This bibliometric analysis uses vosviewers software.

The use of bibliometric analysis because it has advantages in terms of quantification, objectivity, can avoid some potential subjective bias and can confirm the conclusions made by experts in the field of intellectual capital. According to (Ahmi, A., & Mohamad, 2019) that bibliometric analysis is a popular method for revealing trends in the development of articles in a research field. (Rusly, FH, Ahmi, A., Talib, YYA, & Rosli, 2019) defines bibliometric analysis as a methodological approach that can provide more detailed information about publications, including authors, keyword frequency, language used, and citations. Based on these

considerations, this study uses bibliometric analysis

RESULTS AND DISCUSSION

The bibliometric analysis consists of several things, namely the year of publication, the language of the document, the number of citations, the author with the highest citation rank, keyword analysis, analysis by author (researcher).

Publication Year

The first analysis is related to the number of publications per year based on published documents. This analysis is important to help researchers observe the pattern and popularity of IC research themes from year to year. For example, IC research with financial performance, IC with firm value, IC research with competitive advantage, IC disclosure. The result is the number of publications from 2000-2020 as many as 3,993 documents. The highest number of documents per year was in 2010 at 253 documents. The second position with a total of 243 documents in 2005. As for the third position with a total of 221 documents in 2013. The following are the year of publication and the number of documents. The year and number of publications depicted in a Figure 2.

Table 1. Year of Publication Number of Documents

Year	Number of Documents	Year	Number of Documents
2000	132	2011	196
2001	132	2012	180
2002	145	2013	221
2003	155	2014	203
2004	193	2015	199
2005	243	2016	164
2006	139	2017	216
2007	219	2018	217
2008	196	2019	218
2009	194	2020	190
2010	252	**TOTAL (Years 2000-2020)**	**3993**

Data Source: Processed
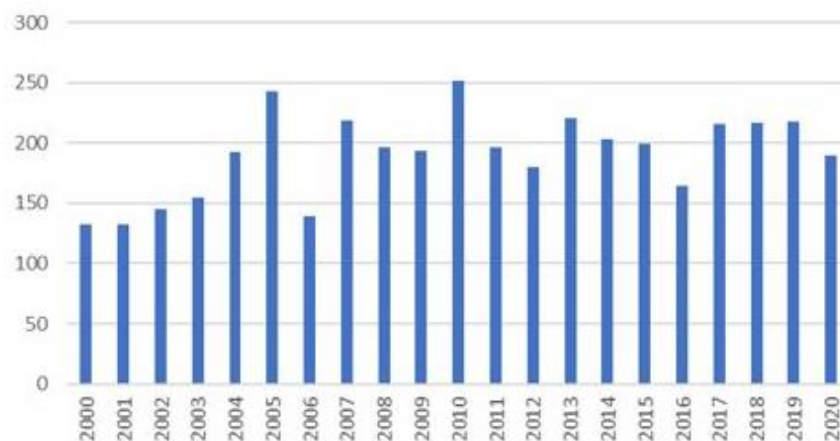
Figure 2. Number of Document

Document Language

The use of language in the articles is also included in the bibliometric analysis. As presented in Table 2, that English is the language commonly used from the publications collected, which is 95.04% of the total documents. Several publications are also published in Thai, Italian, German, Polish, Latvian, Russian, Turkish and Indonesian as well as other languages. Analysis of the language of this document serves to determine the most widely used language in IC research publications. The result is English is the most dominant. This means that for the next IC research, the use of English is more dominant to be able to publish than other languages. For more details can be seen in Table 2.

Table 2. Language Used for Publication

Language	Amount	%
Thailand	1	0.025 %
Italy	1	0.025 %
German	5	0.125%
Poland	2	0.050 %
Latvian	1	0.025 %
Russia	3	0.075 %
Turkey	1	0.025 %
Indonesia	158	3.956 %
English	3821	95.69%
Amount	**3993**	**100%**

Figure 3. Number of Citation

Number of Citations

The highest number of citations per year occurred in 2007 as many as 23,746 citations per year with a total of 219 documents issued. The second position with the number of citatio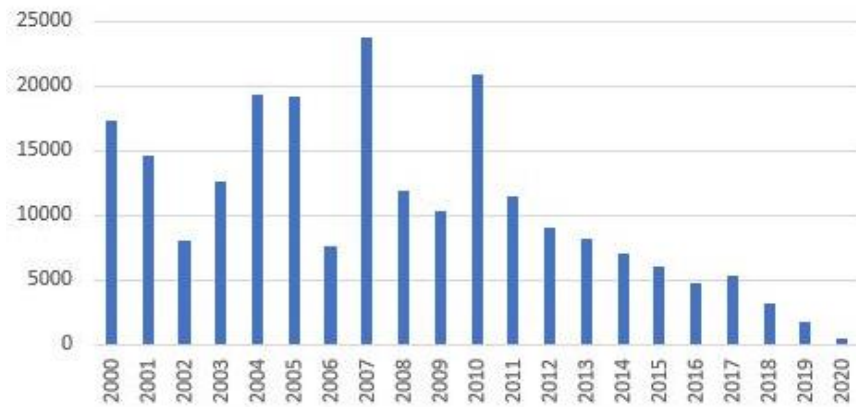ns per year was 20,906 in 2010 with the number of publications of 252 documents. Meanwhile, in 2004 the number of citations per year was 19,346 with 193 documents published. Figure 3, presenting data on total citations per year.

Author with the Highest Citation Rank

The data for the five authors with the highest number of citations are presented in the Table 3. Based on the table, it can be seen that the name of the author Nick Bontis is in the top three for the number of authors with the highest citations. Nick Bontis has indeed become the most popular expert in intellectual capital research. A lot of intellectual capital research has been produced both individually and in collaboration with researchers from various countries. The results of the research on the Google Scholar account belonging to Nick Bontis (https://scholar.google.com/citations?user=hfSk6n0AAAAJ&hl=en&oi=ao) that the number of scientific papers that have been produced is 249. The citations that have been produced from various scientific works are 39,781 citations, the h-index is 77, and the i-index is 155. Based on the table, it can be seen that the single author with the highest citation was 28%, while the second highest citation with more than one author was 27%.

Keyword Analysis

The author maps keywords on each document using VOSviewer.

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Table 3. List of Authors with the Highest Citation

No	Year	Author Name	Research Tittle	Number of Citation	Per Year
1	2000	Nick Bontis, William Chua Chong Keow, Stanley Richardson	Intellectual Capital and Business Performance in Malaysia Industries	2,674	127.43
2	2001	Nick Bontis	Assessing Knowledge Assets: A Review of The Models Used to Measure Intellectual Capital	2,689	134.45
3	2002	Chun Wei Choo, Nick Bontis	**The Strategic Management of Intellectual Capital and Organizational Knowledge**	1.172	61.68
4	2003	Stevenfirer,S. Mitchell Williams	Intellectual Capital and Traditional Measures of Corporate Performance	1,683	93.50
5	2004	Joel AC Baum and Brian S. Silverman	**Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups**	1.525	89.71

Data Source: Processed

VOSViewer is a computer program that can be developed to build and view bibliometric maps. Offers a text-mining function that can be used to build and visualize a network/relationship (cor-relation) in a citation of an article/issue (Tupan, 2016). The keywords have been mapped using VOSviewer. Figure 4 presents a network visualization of keywords that have been created by the author, namely Intellectual Capital. Figure 4

Figure 4. Network Visualization based on Tittle (Version 1)

shows that color, circle size, font size, and line thickness all indicate the strength of the relationship between keywords (Sweileh et al., 2017).

Based on Figure 4, it shows that the connecting line shows the relationship between keywords, the most written documents are those regarding intellectual capital and its relationship to advantage, intellectual capital statements and intellectual capital perspectives, the larger the circle shape shows the number of documents written on this theme.

Thus, there are three major themes in intellectual capital research for 20 years starting from 2000 – 2020, namely intellectual capital and competitive advantage, intellectual capital statement or intellectual capital disclosure (ICD) and intellectual capital perspective. In intellectual capital research which is associated with competitive advantage, it will also

be associated with business performance or financial performance. For example(Hermawan, Sigit., Nurasik., Eva., Duwi Rahayu., 2020) which examines the effect of intellectual capital on business performance and competitive advantage. Then from Figure 4 there is a connecting line of intellectual capital to the perspective and challenge, it shows a theme relationship, for example intellectual capital research that is associated with challenges and perspectives such as the research of Frusinoiu, Dim, and Constantinescu (2017) which examines Challenges of The Intellectual Capital From A Management Perspective Next(Herciua, Mihaela., 2015)which examines the relationship between national wealth, national competitiveness and national intellectual capital. This means that intellectual capital can also be used as

study material at the national or state level and not only in the scope of small companies or organizations. Meanwhile, many experts have done studies on intellectual capital statements or intellectual capital disclosures (ICD).(Hermawan & Milanetty, 2018) also conducted ICD studies on pharmaceutical companies in Indonesia and Malaysia. (Córcoles, 2013)conduct a study on the costs and benefits of educational institutions when conducting ICD. For the intellectual capital perspective, what is meant is the study of intellectual capital which is associated with the development of basic theories or also different objects. For example(Ifleh, Y., Lotfi, M., & Elkabbouri, 2017), (Kamaluddin & Rahman, 2013), and (Hermawan, Sigit, 2013)which specifically examines the relationship

between intellectual capital and the basic theory of IC, namely the resources based theory. There are also many intellectual capital studies that are associated with different research objects. For example intellectual capital in SME's by (St-Pierre, 2011), (Steenkamp, 2010), intellectual capital at university by (Todericiua, 2015).

Figure 5 shows that the color indicates the year of writing where the yellow color ranges from 2015-2020, and the green color ranges from 2010-2015, the purple color ranges from 2005-2010. From Figure 2 it can be analyzed that writing on the intellectual capital theme is the most many in 2010-2015 because green is more dominant than other colors, so that year it has a dominant research theme, namely intellectual capital, competitive advantage, intellectual
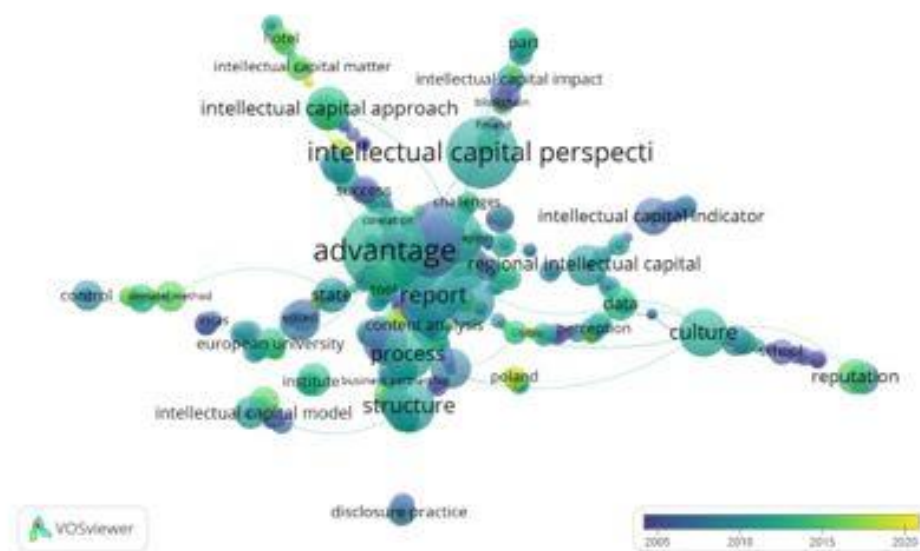

Figure 5. Network Visualization Based on Title (Version 2)

capital statement or intellectual capital disclosure (ICD) and intellectual capital perspective. For connecting lines show the relationship between articles.

Analysis Based on Author (Researcher)

Based on Figure 6, it can be analyzed that the authors who predominantly write about intellectual capital with the greatest number of documents are Bontis, N., Guthrie, j., and Dumay, J. This is indicated by the size of the circle which means that the larger the circle, the more the circle. number of documents written regarding intellectual capital. The relationship line shows the author's relationship with other authors or there is a network with other authors.

Based on Figures 5 and 6, it is found that the three authors with the highest number of documents are Nick Bontis, James Guthrie, and John Dumay. The results of the search by researchers to their respective Google Scholar accounts are for Nick Bontis (https://scholar.google.com/citations?user=hfSk6n0AAAAJ&hl=en&oi=ao) has a citation count of 39,781, the h-index is 77, and the i-index is 155.

Next is James Guthrie's google scholar account with the number of citations are 30,036. (https://scholar.google.com/citations?user=thyCvRMAAAAJ&hl=id&oi=sra) For the h index 71, and the i10-index as many as 230, the number of

Figure 6. Overlay Visualization based on Author

scientific works is 627. Furthermore, for the John Dumay google scholar account(https://scholar.google.com/citations?user=zKFxle4AAAAJ&hl=en&oi=sra) with the number of citations 11,599, the h index 45, and the i10-index is 100. With a total of 173 scientific papers. Indeed, the articles or scientific works in the Google scholar account of the three experts are not all related to intellectual capital but mostly about intellectual capital . With the results of this prolific author, it can trigger other intellectual capital researchers to be more productive and the research themes of experts can be an inspiration to conduct intellectual research in the future.

CONCLUSION, IMPLICATION, AND LIMITATION

Publications from 2000-2020 with a total of 3993 documents. The first largest number of documents in 2010 was 253. The second position was with 243 documents in 2005 and for the third position with 221 documents in 2013. Meanwhile, the language that is widely used for publication articles is English as much as 95.04% of the total document. Several publications are also published in Thai, Italian, German, Polish, Latvian, Russian, Turkish and Indonesian as well as other languages. The highest number of citations or

citations per year occurred in 2007 as many as 23746 citations from a total of 219 documents published. The second position with the number of citations was 20,906 in 2010 with the number of publications of 252 documents. Meanwhile, in 2004 the number of citations was 19,346 with the number of publications of 193 documents.

The most written documents are those regarding intellectual capital and its relationship to advantage, intellectual capital statements and intellectual capital perspectives, the larger the circle shape indicates the number of documents writing with that theme. The dominant writers who wrote about intellectual capital with the highest number of documents were Bontis, N., Guthrie, j., and Dumay, J. The author wrote on the theme of intellectual capital the most for Bontis and Gutrie around 2005-2010. For the author Dumay most documents around 2010-2016.

The suggestion of this research is that intellectual capital researchers can understand the research themes that have been carried out and will be developed. Intellectual capital researchers can also study authors who are productive in writing intellectual capital articles so that they can be an inspiration in conducting research and writing on intellectual capital themes. The use of bibliometric

analysis with VosViewer is still wide open in intellectual capital research, especially the use of various keywords. For the development of accounting science, IC research is still very open to opportunities related to other accounting fields such as accounting information systems, business and professional ethics, auditing, taxation, internal control systems, behavioral accounting, sharia accounting and others.

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