The Extent and Impact of Intellectual Capital Research: A Two Decade Analysis

Umesh Bamel

Organization Behaviour and Human Resources, International Management Institute New Delhi, New Delhi, India

Vijay Pereira

Neoma Business School, Reims Campus, Reims, France

Manlio Del Giudice

Management University of Rome Link Campus University, Lazio, Italy and National Research University Higher School of Economic, Moscow, Russian Federation, and

Yama Temouri

Khalifa University of Science and Technology, Abu Dhabi, United Arab Emirates and Aston University, Birmingham, UK

Abstract

Purpose - This paper examines the leading publication trends including the extent and impact of intellectual capital research in the *Journal of Intellectual Capital* (JIC) over a two-decade period (2000 to 2020). The bibliometric analysis offers the description of publications trends such as key authors, articles, cited references, institutions and countries-in other words the extent and impact in the field. This paper also presents the knowledge structure (including conceptual, intellectual and social structures) of JIC i.e. prominent themes, co-citation and bibliographic networks.

Design/methodology/approach – In order to achieve research objectives, we collected the bibliographic information of the articles published in JIC for the period 2000 to 2020 from the Scopus database on 11.04.2020. The bibliographic information of 737 documents were analysed using to open source analysis tool i.e. bibliometrics package in r software and VOSviewer. These tools were used to create the graphical visualization of bibliographic data on basis of co-occurrence, co-citation and bibliographic coupling.

Findings – The results show that the journal is progressing in terms of publication quantity and reputation in the field. To date, 737 documents have been published in JIC, which includes 659 research articles, 8 editorials, 7 notes and 63 review papers. This paper also portrays the author impact list in terms of most impactful articles published in JIC. Country-wise Italy, Australia, and USA exert most influence on JIC scholarship.

Originality/value- Bibliographic analysis offers a comprehensive understanding of past trends and presents the future direction of a journal.

Keywords: Bibliometrix, Bibliometric, Citation analysis, Intellectual capital disclosure, Intellectual Capital reporting, Journal of Intellectual Capital, Knowledge Management, Scopus, h-index

Introduction

The journal of intellectual capital (JIC) is a double-blind peer reviewed leading international journal within the intellectual capital domain. JIC primarily publishes research on various topicalities of intellectual capital within the context of a modern knowledge economy (Bongiovanni et al., 2020; Oliveira et al., 2020; Popkova and Sergi, 2020). JIC is indexed in journal citation report of Web of Science (WoS) with an impact factor of 3.744 and in Scopus with a CiteScore of 6.48. These index values place JIC as a journal in the top quartile in business and management categories. Rory L Chase (MD, Teleos, UK) started JIC in the year 2000 and the journal published four issues annually, with the number of publication frequency increasing to five issues in 2018 and further to six issues in 2019. Since its inception, the growth and reputation of JIC has increased immensely and JIC has thus witnessed a huge influx of submissions. JIC is a leading and distinguished title and has a strong impact on the intellectual capital knowledge base (de Pablos and Edvinsson, 2020; Kim et al., 2020).

Currently, Merrill Warkentin leads the journal (editor) with six editorial sections: Bradley S. Trinkle and Ofir Turel, Business research method; Xin (Robert) Luo and Bo Xu, Emerging Topics in Intellectual Capital Research; Valentina Cillo and Stefano Fontana, Intellectual Capital, Firm Evaluation, Organization Studies, and Sustainability; Stefano Bresciani, Knowledge, Technology and Innovation Management; Jacques Ophoff and Karen Renaud, Securing the Organization's Knowledge and Information; Marco Romano and Francesco Schiavone, Strategic Management, Human Resource Management, Learning Studies. Veronica Scuotto is assisting the journal editorial leadership.

It is evident that journals usually publish a review, a special issue or an editorial to celebrate anniversaries (Van Fleet et al., 2006; Meyer and Winer, 2014). Recently there has been an interesting trend i.e. publishing a bibliometric review of the journal whenever a journal reaches or achieves a publishing milestone. Some of these are noted here: a bibliometric overview of Journal of Business Research (Merigó et al, 2015); fifty years of European Journal of Marketing (Martínez-López et al., 2018); fifty years of Financial Review (Baker et al., 2020), as examples. Further recent examples of journals published such review articles have been in the British Journal of Management (Pereira et al., 2020), who analysed three decades of emerging market research, providing future research directions; the Asia Pacific Journal of Management (Budhwar et al., 2019), who reviewed the state of HRM in the Middle East, identifying key challenges and providing future research agenda; the Journal of Business Research on outsourcing and offshoring decision making (Pereira et al., 2019).

Such reviews of a journal offer a comprehensive evaluation in terms of its publication trends and patterns (Martínez-López et al., 2018; Merigo et al., 2015). It also aims to identify popular themes, scholars, department/universities/countries- which contribute maximum publications in a domain i.e. the extent and impact in a particular field of study. These aspects have thus led to a surge in such type of review publications (e.g. Bamel et al., 2020, Kumar et al., 2020). In addition, bibliometric analysis helps in visualising the structures of a research field objectively i.e. clustering and citation patterns of related documents (Vogel et al, 2020). Thus, bibliometric method has gained widespread attention in recent time and is considered as more objective approach for reviewing a knowledge domain and base (Vogel et al, 2020). JIC has recently celebrated its 20th anniversary and is now 2 decades old, during which it has published 737 research documents. This has been the key motivation to thus develop this study, whose

objective is to describe the general publication trends and knowledge structure in JIC. This review piece looks at the past (i.e. evolution and historical progression of intellectual capital knowledge base), the present (i.e. current trends), and the future (i.e. emerging trends and future course of development in the intellectual capital research base in JIC). More specifically, this study aims to answer following two key research questions:

RQ 1: what is general description and publication trend in JIC in term of top ranked authors, top cited articles, top publishing institutes and countries, and top ranked key words?

RQ 2: what is the conceptual (2 a), intellectual (2 b) and social (2 c) structure of the extent and impact of intellectual capital knowledge in JIC?

In order to answer these questions, we analysed the quantitative properties such as citation information and citation publication structure of the documents that have been published in JIC. For structuring the knowledge domain of the journal, this paper presents keyword co-occurrence network, time overlay visualization of key words, co-citation and bibliographic networks and collaboration network among authors, institutes and countries. This type of analysis of JIC would help in assessing its contribution within the intellectual capital knowledge domain, as it identifies prominent as well as emerging research themes, that will help understand the future direction of research in this domain (Kumar et al. 2020).

The paper is structured as follows. The next section of the study details the methodology of the paper, followed by results and discussion. The paper concludes by summarizing the contributions as well as the limitations of the paper.

2. Method

The principle objective of this paper is to present a quantitative review of the intellectual capital knowledge published in JIC in last two decades. To achieve this objective, bibliometric information of documents was retrieved and analysed using Bibliometrix R package (Aria & Cuccurullo, 2017) and VOSviwer (Van Eck et al., 2010). The data search and retrieval process and the methodology are discussed in detail below. For data retrieval, we followed the established protocols for systematic literature review (e.g. Christofi et al., 2019; Vrontis & Christofi, 2019).

2.1 Data search, retrieval and sample

We used bibliometric indicators such as total number of publications, total citations, h index, link strength etc. (Garfield, 1955, Bamel et al., 2020). Usually, bibliometric information of research articles is retrieved from Web of Science (WoS) and Scopus databases. In this study, we retrieved this information from Scopus. Scopus database is termed as more comprehensive abstract and citation database (Bamel et al. 2020). In the search bar, we searched for Journal of Intellectual Capital in "source title" on 09.04.2020. The initial search yielded us with 1136 documents from Journal of Intellectual Capital (JIC) and International Journal of Learning and Intellectual Capital (IJLIC). Since, focus of this paper was to review JIC knowledge base, we limited our search to JIC. This refinement yielded 737 documents published in JIC from 2000 to 2020. These 737 documents included 659 articles, 8 editorials, 7 research notes and 63 review articles. These articles were published by 1189 authors (165 single authors and 1024 multi-author). The other bibliometric indicators such as collaboration index of the data set was 1.96; documents per author was 0.62; authors per document was 1.61; and co-authorship per

document was 2.26. These documents have 39.72 average citation per document with 1202 authors' keywords.

2.2. Bibliometric methodology and data analysis

Originally, the bibliometric methodology was introduced as a technique in library science as it provides a general overview of a set of documents using bibliometric indicators information (Garfield, 1955, Pritchard, 1969). This study considers the number of publications by an author, organization, country; number of citations, h index etc., to analyse general research trends, authors, universities, keywords, publication and citation structure, temporal evolution- to name a few. Such analyses (journal specific analysis) are gaining interest and acknowledgement in almost all field of studies, for e.g. Employee Relations (Kumar et al., 2020) and Financial Review (Baker et al., 2020), as topics or fields of study.

The composed data was then analysed using the computer programs Bibliometrix R package (Aria & Cuccurullo, 2017) and VOSviwer (Van Eck et al., 2010). To answer the research question one i.e. what is general description and publication trend in JIC in term of top ranked authors, top cited articles, top publishing institutes and countries, and top ranked key words, we used Bibliometrix R package (Aria & Cuccurullo, 2017). Similarly, to answer research question two i.e. conceptual, intellectual and social structure of the extent and impact of intellectual capital knowledge in JIC, we developed graphical mapping (bibliographic coupling, co-citation analysis, co-occurrence of keywords analysis etc.) of bibliographic information (Sinkovics, 2016) using VOSviwer (Van Eck et al., 2010).

3. Results, findings and Discussion

This section discusses the results and findings of the bibliometric analysis of JIC corpus's indicators retrieved from Scopus. Since its first issue was published (in 2000) to date JIC has published 737 documents which includes 659 articles, 63 review articles, 8 editorials, and 7 research notes. These 737 documents have received 29273 citations (on date of data retrieval) with a ratio of (cites/study) being 39.7 and the *h*-index of the journal is 73. We now present our results, based on our research questions.

3.1 Publication trends and general description of publications in JIC

The research question one is to understand the general publication description, publication trends and citation structure of the extent and impact of intellectual capital knowledge in JIC knowledge base.

3.1.1 General publications trend and citation structure of JIC over 20 years

Over the last 20 years JIC publications are portrayed through figure one, which presents the annual evolution of the number of published documents in JIC. In 2000, the first year of JIC publications, it published 24 documents and within the next 6 years, the annual number of publications in JIC reached 44. From 2008 to 2014, the annual number of publications has been decreased, however this trend reversed in 2015 and gained momentum again. Generally, the number of publications in a journal should increase over a period of time due to two main reasons i.e. increased interest of scholars in a particular domain and advancement of digital information technology infrastructure that increases the ease of access, submission, and

distribution publications (*Martínez-López* et al., 2018; Merigo et al., 2015). Another specific cause to the progression of publications in JIC is the increased popularity of intellectual capital as a scholarly domain. A number of academic examinations (Bontis and Fitz-enz, 2002; Chen et al., 2005) have established a positive relationship between intellectual capital and firm performance.

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Next, in order to understand impact of the journal we developed the citation structure of the JIC using various citation threshold for last two decades (Table 1). It is evident from the Table 1 that the number of citations for JIC are increasing and JIC has received 29,273 citations (on the date of data retrieval). During the initial few years, JIC publications have not received significant citations as compared to recent years, wherein the number of documents cited more than 10 and 50 times (in a particular year) increased significantly. In terms of citation count, 0.27 percent of JIC publications have been cited more than 500 times, almost 7.5 percent documents received more than 100 citations, 15 percent documents have received more than 50 citation, almost 28 percent documents have received at least 20 citation, almost 31 percent documents were cited more than 5 times, and only around 7 percent documents have not received any citation. Majority of these (7 percent) documents are published in 2019 and 2020, except editorials and commentaries. The number of publications appearing in other sources citing JIC are also increasing speedily and this number crossed the threshold of 100 within the first few years of JIC and thereafter crossed the threshold of 1000 in 2019. This indicates the impact and significance of JIC on debates about intellectual capital and knowledge.

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As a next step we analysed the leading trends in terms of top authors, institutes, countries and journals, citing JIC publications. Table 2 ranks the top 25 Authors, Institutes, Counties and Journals who cited JIC. Our analysis found that Bontis, N. lead the list and published 77 documents citing JIC and almost 17 authors among the list have published more than 25 documents each. McMaster University and Macquarie University lead the list of Institutions who are citing JIC. The majority of the institutions in the list are from Europe. In terms of countries, United Kingdom, Italy, United States, Spain leads the list. European countries dominate this list also followed by countries from the Asian continent. In terms of top journals, we found the phenomenon of self-citation in JIC also. Self-citation is very usual phenomenon among journals (Merigo et al., 2018). Other journals which have publications citing JIC are Journal of Knowledge Management, International Journal of Learning and Intellectual Capital, Knowledge Management Research and Practice, Management Decision, Journal of Business Research, and so on. The majority of these journals have knowledge management, information systems and similar applications as main scope.

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3.1.2 Key authors in JIC and their Citation Structure

This section offers a general overview of the most productive authors, their various citation index and their citation structure using various citation thresholds. This analysis reveals an author's highest achievements in terms of number of publications and citations as per the Scopus database (Merigo et al., 2018). Table 3 presents the most productive authors who have published at least five documents in JIC, excluding editorials. The list includes 27 authors, and these authors are ranked as per number of publications, in case of a tie in publication numbers, we ranked them according to their number of citations. Table 3 also presents the current affiliation of the top ranked authors.

The raking identified John Dumay of Macquarie University, Australia as most productive author. He has authored 29 documents in JIC and has received 1118 citations with h index 18. Authors from Australian universities dominates the list of top publishing authors, followed by authors from Italian universities. Table 3 also presents the citation structure of the top publishing authors with respect to certain citation thresholds.

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3.1.3 Most influential(cited) papers published in JIC

Since its first issue, JIC has produced many impactful contributions which have made significant contributions in business and management research. Table 4 ranked 25 most influential papers published in JIC in last two decades, as per Scopus database. The top two publications in the list have received more than 500 hundred citations each. The top ranked article is authored by Bontis et al (2002) and examines the relationship between intellectual capital and business performance with 34.3 citations per year. The second ranked document (Petty and Guthrie, 2000) is a review paper which consolidates the measurement, reporting and management of intellectual capital. The majority of the documents in the list have appeared during 2000 and 2001.

A close analysis of this list reveals that a significant proportion of these publications examines the relationship between intellectual capital and firm performance. Other issues addressed by these publications covers measurement, reporting and disclosure of intellectual capital.

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3.1.4 Most cited documents in JIC

This section discusses the publication which have received maximum citations in JIC. Table 5 present the list of the top 25 publications which have received maximum citations in JIC. The

top ranked document is authored by Bontis (1998) and published in Management Decision. This article explores the measure and models of intellectual capital. The oldest article in terms of year of publication appeared in 1996 and newest one was published in 2016. The majority of these articles are review articles, which consolidates our knowledge on various intellectual capital topics. Another observation is that a major proportion of this list's documents are published in JIC. The remaining publications are from journals such as Management Decision, Academy of Management Journal, Academy of Management Review, Long Range Planning, European Management Journal and so on.

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3.1.5 Most productive Institutions, Countries and most frequent Keywords

Table 6 ranks the most productive institutions and countries in terms of number of publications and citations received, on the topic. In addition, this table also ranks 25 most frequently used keywords. Please note that the number of publications is considered as ranking criteria and in case of a tie, citations received is considered as a ranking criterion. Macquarie University with 44 publications is the most productive institution in JIC. The list is followed by McMaster University (27 publications), The university of Sydney (17 publications), Cranfield school of management (13 publications) and University of Ferrara (13 publications).

JIC is thus established as a truly international journal, which has provided a platform to scholarly publications from across the globe. The list of top 25 countries is led by Italy with 120 publications and 5845 citations. This is followed by Australia (number of publications 109), USA (84 publications), UK (68 publications) etc. This ranking list indicates that JIC strongly attracts European and Australian scholars. However, apart from European countries many Asian countries have also appeared in top the 25 ranked list of countries.

Table 6 also presents the 25 most frequently appeared authors key words. The list includes key words such as intellectual capital, intangible asset, knowledge management, human capital, intellectual capital, financial reporting and so on.

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3.2 Conceptual structure of JIC Publication Corpus

Bibliometric analysis is used extensively to develop the knowledge structure of a particular domain (Aria and Cuccurullo, 2017). Part one of research question two (2 a) of the present study is about understanding the conceptual structure (sate and evolution) of the scholarship published in JIC in the last two decades. To achieve part of this research objective, we used co-word analysis and constituted strategic diagram of authors keywords used in 737 publications of JIC. Co-word analysis provides insight about various themes or concepts within a knowledge domain (Van Eck and Waltman, 2010). Key words are considered as the representative terms of the content/themes in a knowledge domain and the co-occurrence of keywords in a document indicates the linkage between the themes of the document (Zupic & Čater, 2015). Keywords of a document are assumed to present an appropriate description of a documents' content and

their co-occurrence reveals the pattern and evolution of a knowledge within a domain (Aparicio, et al., 2019).

For constructing the strategic diagram of JIC research, we considered 500 keywords out of a total of 1208 keywords and used a bibliometrix package to visualize a strategic diagram. A strategic diagram displays various themes which are characterized by measures such as centrality and density (Cobo et al., 2015). Centrality denotes the degree of interaction or strength of ties of a theme, with other themes and density, and is a measure of strength of internal ties within a theme (Aparicio, et al., 2019; Murgado-Armenteros et al., 2015). On the basis of degree of centrality and density, a strategic diagram displays a quadrant and represents four types of themes i.e. motor theme (upper right quadrant, high centrality and high density), peripheral theme (upper left quadrant, high density and low centrality), emerging or disappearing (lower left quadrant, with low density and low centrality) and transversal, general or basic theme (lower right quadrant, with low density and high centrality).

The strategic diagram (figure 2) presents a total 8 themes in the four quadrants. Three themes namely Intellectual Capital, Disclosure, and Intellectual Property come under the general or basic quadrant. These three themes appeared as very important themes in JIC knowledge bases. Themes in this quadrant have a high density and low centrality, and means that these themes have a high strength of internal ties and are well developed. The size of the circles substantiates that these themes are well researched, however, scholarly inquires in these themes are further warranted.

Intellectual capital theme is seen to be the largest is size and constituted of keywords such as intellectual capital, intangible asset, knowledge management, human capital, social capital, relational capital, measurement and performance etc. This theme appears as the fundamental theme in JIC research corpus and research on this theme have addressed the fundamental questions relating to the concept and measurement of intellectual capital in various contexts. The publication period for this theme is spread over entire 20 years span.

Disclosure was found to be the second largest theme, which appeared in the basic quadrant and constituted of keywords such as integrated reporting, finance reporting, intellectual capital reporting, annual reports, intellectual capital disclosure, etc. Researches under this theme addressed the issue of reporting and disclosure of intellectual capital such as disclosure of non-financial capital, trends in intellectual capital disclosure, human capital disclosure, competitiveness and intellectual capital disclosure etc. Similar to the previous theme, this theme's research appeared over a 20 years' span.

The third theme which appears in the basic quadrant is intellectual property and this theme includes keywords such as patents, assets valuation, resources, japan and performance management etc. This theme has addressed the research issues such as scale development and modelling of intellectual property, auditing of patents portfolios, option pricing in intellectual property, valuation of intellectual property and so on. The majority of the research on this theme is published in blocks, which were seen to be 2000-2002, 2005-2008 and 2018-2019.

Universities, as a theme, appeared mainly as a motor theme and constituted of keywords such as knowledge, research, higher education, public sector, intellectual capital management, Italy, Spain etc. This theme appeared as a motor quadrant, which means this theme has been well developed, important and central for the JIC research corpus. Research on this theme primarily

examines issues related to intellectual capital in universities such as intellectual capital reporting in universities, future direction of IC research in universities, IC and university performance, IC management in universities, patents, research and development activities in universities etc. The majority of the publications on this theme appeared between 2013-2018.

Value, as the next theme appeared partially as a motor and partially as a peripheral theme, and this includes keywords such as balanced score card, entrepreneurship, tacit knowledge, company performance, knowledge sharing, knowledge transfer, company performance etc. Positioning of this cluster indicates that this theme is important in establishing JIC research and is also somewhat niche as this examines issues such as location of a firm in intellectual capital performance, intellectual capital and book value of productivity, intellectual capital and firm market value and value creation, etc. Most of these publications appeared between 2004-2014. However, this theme has contributed significantly in establishing intellectual capital as an important phenomenon for modern organizations.

Two themes namely Strategy and, Value Creation appeared under the peripheral or niche theme. The size of these themes denotes the quantity of publications and it indicates that these are very focused themes and includes publications on value creation through intellectual capital and strategic focus on intellectual capital. The theme Strategy has publications such as firm strategy and cybersecurity from knowledge perspective, and intellectual capital for supporting firm strategy, intellectual capital and overall strategy etc. The publication period of these documents is spread over the last two decades. The theme Value creation has publications that includes topics or issues such as intellectual capital and big data, intellectual liabilities, contribution of intellectual capital in value creation, value driver for intellectual capital in university, benefits and cost of intellectual capital in small firm etc. The publication period of this area of research suggests that this is an evolving theme in JIC, as the majority of these publications appeared in the last few years.

The lower left quadrant of the strategic diagram (Figure 2) includes a key theme namely Organizational Learning. This indicates this could be either an emerging or disappearing theme within the JIC research corpus. Our analysis however suggests that this is a disappearing theme and publications having keywords of this theme were published during initial years of the JIC and very few were published around 2011 and 2012. These publications were mainly on learning organization, diffusion of tacit knowledge in organizations, performance measurement for human capital building etc.

Conclusively, the above section thus presents the conceptual structure of the JIC research and our analysis found that JIC research has been mainly structured under 7 key themes

3.3. Intellectual structure of the JIC research

The second part of our research question two (2 b) of the study is about developing and understanding the intellectual structure of the extent and impact of the JIC knowledge base. Intellectual structure can be understood as an "organised map of salient features of a knowledge base and it reveals the disciplinary composition and tradition of research in a knowledge domain" (Shafique, 2013, p 2). In order to constitute the intellectual structure of JIC knowledge base, this study employs bibliometric and network methods i.e. historiography which is based on a combination of direct citation of pioneer/milestone research work; co-citation analysis of

authors and journals cited; and bibliographical coupling of authors (Aria and Cuccurullo, 2017).

3.3.1 Historiography of JIC Corpus

Encyclopaedia Britannica defines historiography as a writing of history based on critical examination of selected knowledge sources. In other words, a historiographic map reveals how ideas travel through time from one source of knowledge to another source of knowledge i.e. publications in current section (see work by Sarnecky, 1990 in the context of nursing as a topic of research). We have thus developed a historiographic map of the most influential publications of JIC, in essence to understand and visualize the progression of research ideas in JIC chronologically.

Figure 3 shows the historiography map of the top 50 most influential publications in/of JIC. Our examination of the map shows two distinct streams of research. One stream of research primarily focuses on the relationship between intellectual capital and firm performance and/or its competitive advantage (Bontis et al., 2000; Bontis and Fitz-enz, 2002; Clarke et al., 2011; Chen Goh, 2005; Pew Tan et al., 2007; Joshi et al., 2013; Dženopoljac et al., 2016). Further to such empirical examinations of the said relationship, we see review based research work also undertaken, to consolidate scholarships within this stream (Inkinen, 2015). One important sub-theme of research under this stream is the measuring of intellectual capital (Nazari and Herremans, 2007; Keong Choong, 2008).

The second research stream in JIC research corpus primarily focuses on the reporting of intellectual capital (April et al., 2003; Dumay, 2009). We observed a topicality movement in this stream of research i.e. reporting of a disclosure of intellectual capital (Abeysekera, 2006; Dumay, 2016). Value creation and value addition were other key and important subthemes emerging within this stream of research (Bismuth and Tojo, 2008; Marr et al., 2004).

Figure 3 also suggests that there is a subset of knowledge sources (Abdolmohammadi, 2005; Bounfour, 2003) that links these two main streams of research. within the JIC corpus. Conclusively, the historiographic map shows that there are two main streams of research with one subtheme in each stream. Though these two streams have grown in parallel, however there has been a greater focus of the second stream, as compared to the first, as it has received more scholarly attention. Another observation is that around 2004-06 few publications provided linkages between these two influential streams of research in JIC publications

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3.3.2. Co-citation analysis of sources and documents

We further developed a co-citation network to have an in-depth understanding of the evolution of knowledge base in JIC. As is understood from the literature, co-citation occurs when for e.g. document A and document B are cited together in a document C (Small, 1973). Co-citation usually considers references of primary documents, and thus it is implemented for cited documents and journals (Martínez-López et al., 2018). Co-citation network analysis is thus

usually considered as a means to understand the historical evolution of a particular knowledge base.

As a first step, we developed a co-citation network of cited journals in JIC. Out the 10,646 sources, 203 met the initial criteria of a minimum 20 citations. Among these 203 sources, we considered the top 100 sources, with a maximum link strength. The co-citation analysis of the top 100 linked sources cited in JIC yielded a network of three clusters (see Figure 4). This network has 4,745 links with a total link strength of 30,5928. Cluster one (grey) is the largest cluster and it has 55 sources in it. Few of these include studies from the Academy of Management Journal, Journal of Knowledge Management, Strategic Management Journal, Journal of Management, Management Decision, Journal of Management Studies, Organization Science, and so on. We named this cluster as general management and knowledge management cluster. The second largest cluster in the network is then positioned just opposite of cluster one. This cluster has 32 sources, that include for e.g. the Journal of intellectual Capital, Journal of Accounting Research, European Accounting Review, Accounting and Business Research, The Accounting Review- to name a few. We named this cluster accounting review cluster. It is evident from the figure that this cluster is based in JIC and hence depicts the high degree of conceptual similarity of intellectual capital with the accounting domain. The third cluster (dark grey colour) has 13 sources, and here, most of these sources are books, and hence we named this cluster as book cluster.

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Our next step then included the construction of a co-citation network of cited documents. Out of 31,298 cited documents 558 met the initial criteria of minimum 5 citations and on the basis of a maximum link strength among these documents, the top 100 documents were considered for network development. The co-citation network of cited documents (see Figure 5) has yielded three clusters with 3,719 links with a total link strength of 11,260. We named this cluster after the main theme of the documents within the clusters. Cluster one, (grey colour nodes) has 39 items and include a few main issues that are addressed in this cluster, which are measures and models of intellectual capital, intellectual capital and firm performance etc. Here, cluster one was named as intellectual capital and performance cluster. This cluster is mainly based on Bontis' work. Cluster two (white colour nodes) constituted of 31 documents and the main theme of examination in this cluster was the reporting and disclosure of intellectual capital. Cluster two is based in the work of Bozzolan and colleagues. Cluster three (dark grey colour) has 30 documents and this cluster was mainly about consolidating the intellectual capital research. This cluster is based in Guthrie and Dumay.

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3.3.3 Bibliographic coupling among authors writing in JIC

Our next step involved developing a bibliographic coupling network. Bibliographic coupling is another extensively employed approach, which aids in visualizing knowledge networks within a domain (Zhao and Strotmann, 2008; Bamel et al., 2020). The difference between co-citation network and bibliographic coupling network is that co-citation network considers secondary documents to understand the historical focus and evolution of a field, whereas bibliographic coupling is future oriented and it considers primary documents for identifying the emergent topics and future directions of a field (Vogel, 2012). Two units A and B (paper, author, institutes etc.) are said to be bibliographic coupled if they both cite a unit C. In other words, two bibliographically coupled units would have a degree of similarity in their references (Van Eck and Waltman, 2014). We created two bibliographic networks using authors (see figure 6) and documents (see figure 7), as unit of analysis. These networks are detailed below.

For constructing authors' bibliographic network, out of 1,196 authors, the top 100 authors with a maximum link strength were considered. This yielded a network with four clusters (Figure 6) having 4,950 links and 187,818 total link strength.

Cluster one (red colour nodes situated on the hand left side of the network) is the largest cluster of the network and includes 53 authors. This cluster is based in Bontis, apart from a few other influential authors in this cluster, namely Roos, G., Bounfour, A., Durst, S., Cricelli, L., and so on. Since the early years of JIC-to date the main focus of this cluster is on intellectual capital and firm performance (Bontis e al., 2000; Agostini et al., 2017). However, the indicators of firm performance are now moving from the traditional measures of performance to novice indicators such as innovation, competitive advantage, value creation, wealth creation etc. In terms of emerging focus, value creation, innovation, concept of value and integration of strategic perspective, within the intellectual research domain, and hence these are now the newly emerging research areas within JIC (Bounfour et al. 2018; Pedro et al., 2019).

Cluster two (white colour nodes) are the second largest cluster in the network and this cluster is based in Chiucchi, M.S., Massaro, M., Lombardi, R., Johanson, U., Giuliani, M., Bukh, P.N., Abeysekera, I. and so on. The main research focus of this cluster remains on reporting and disclosure of intellectual capital (Davey et al., 2011; Dumay, 2019), however it is found that this theme is moving towards a mandatory framework for reporting and disclosure of intellectual capital.

Cluster three (blue colour nodes on the bottom of the network) constitutes 10 scholars. This cluster has a niche focus on creation and measurement of intellectual capital (O'Donnell, 2004; Grimaldi et al., 2018). This cluster also explores the role of certain HR practices in creation of intellectual capital and interestingly has an emphasis on university as a unit of analysis.

The smallest cluster (yellow colour nodes, situated on the upper side of the network) constitutes of 5 scholars, namely Bianchi, Martini S., Corvino, A., Doni, F. and Rigolini, A. and Anifowose, M. This cluster appeared as a niche cluster, though it is emerging and primarily addresses the issue of relational capital with respect to its reporting and firm performance (Corvino et al., 2019).

---------------------------------INSERT FIGURE 6 ABOUT HERE------------------------------

Our next steps included developing a bibliographic coupling network of documents published in JIC. The top 100 articles having maximum link strength with at least 20 citations from a total of 737 publications were considered for this network. The bibliographic coupling network for the documents generated a three-cluster network (see Figure 7) with 4,928 links with a total link strength of 33,195.

Cluster one (red colour nodes, situated on the right-hand side of network) is the largest among the three clusters and constitutes 46 documents. This cluster is represented by Roos (2017) and it integrates economic complexity theory, knowledge management with national prosperity, through the lenses of intellectual capital. Another seminal work situated in this cluster is that of Martín-de castro G. (2019), which offers future directions of intellectual capital research. Asiaei et al., (2018; 2020) work extends the scope of intellectual capital domain to human resource practices such as performance management. Another identified offshoot of intellectual capital research is the role of intrapreneurship (Asiaei et al., 2020). Diversification, as a topic of research is also an extension in terms of a contextual focus i.e. geography (from developed economies to developing) and industry (from financial, non-profit, to heath care institutions). Contextual diversification of a research field is usually warranted to establish the legitimacy of a domain. Our analysis, also depicts a few other emerging areas, such as social capital, innovation and informational and communication technology (ICT), within this cluster.

Cluster two (green colour nodes positioned on the left-hand side of the network) is the second largest cluster in the network and constitutes 38 primary publications. This cluster is represented by Cabrita (2017), and the main focus of this field of research is on reporting and disclosure of intellectual capital. An emerging trend in this cluster is social media (Pisano et al., 2017), and big data (Secondo, 2017). The third cluster (blue colour nodes located beneath cluster one) is the smallest cluster in the network and is constitutes 16 papers. This cluster is represented by Pedro et al., (2018); Dzenopoljac et al., (2017) and the focus of this cluster is limited to the relationship between intellectual capital and firm performance (Singh, 2020). This theme of research is continuously gaining maturity, specifically in terms of contextualization and indicators of performance.

Conclusively, the bibliographic coupling network suggests a few areas which are perpetual and continuing in nature, and these include intellectual capital and firm performance linkages. These are however also evolving in terms of indicators of performance. Similarly, reporting and disclosure remains the most researched field in JIC, for now. A few other emerging areas of research in JIC are innovation, big data, social media, integration of various theoretical models such HR practices, certain phenomenon of physics, etc., within intellectual capital research.

3.4 Social structure of JIC publications

To address the next part of research question two (2 c), of the study, we employed collaboration analysis of authors, that appeared in JIC publications. Collaboration analysis is a tool to understand the social structure of a research domain (Aria and Cuccurullo, 2017). We considered all 1,196 authors and based our analysis on the maximum collaboration strength of a network of 137 constituent authors (Figure 8). This network has 13 clusters, and we named these cluster after the name of authors who were central to the cluster.

Cluster one is the largest cluster (21 authors) and is central to the social network. This cluster is represented by Dumay, J., and it has a few sub-clusters. Sub-cluster 1 is represented by Farneti, F., Gasonato, F., Valentinetti, D.; similarly, sub-cluster 2 is represented by Garanin, T., Berezinets, I. and Andreeva, T; and sub-cluster 3 is represented by authors namely Lombardi and R., Cuozzo, B. It is thus evident from the social network that cluster one is very heterogeneous.

Cluster two is the second largest cluster and has 19 authors, who are grouped in this cluster. The main authors in this cluster are Bukh, P.N., Mouritsen, J., Nielsen, C. Lee, A. and so on. This cluster is also very heterogeneous and has many sub-clusters. Cluster three is the third largest group of authors (14 authors) and is represented by Roos, J., Pike, S. and Fletcher, A.

Cluster four includes 13 authors and is represented by Guthrie, J. and a few other prominent authors, namely Petty, R. and Caddy, I. Cluster five also includes 13 authors and is represented by Johanson, U. and Skoog, M., Holland, J. and so on. Cluster six, again also includes 13 authors and is represented by Secundo, G.

Cluster seven, has nine authors and is represented by Marr, B. and Chatzkel, J. cluster eight, is represented by Manes Rossi, F. and Nicolo, G. and has eight authors in total. Cluster nine has six authors and is represented by Abhayawansa, S.A. This cluster is positioned near the Guthrie cluster, depicting a proximity. Cluster ten also has 6 authors and this is represented by Massaro, M. and Bagnoli, C., and here too, this cluster has a proximity with the Dumay cluster.

Cluster eleven, twelve and thirteen are comprised of 5 authors each. Cluster eleven is represented by Schiuma, G. and Carlucci, D. C., and this cluster has a proximity to the Marr and Secundo cluster. Cluster twelve is represented by Chiucchi, M.S. and Giuliani, M. and has proximity to the Bukh cluster. Clauter thirteen is represented by Massingham and is connected with the Dumay cluster.

Conclusively, the social structure/network (Figure 8) depicts that there are various collaboration networks in JIC scholarship, and that JIC has been attracted by scholars from diverse domains.

4. Implications

This study contributes by offering a reflection on the extent and impact of intellectual capital knowledge in JIC over the past 20 years, utilizing a quantitative and structured literature review. Our reflective analysis offers an opportunity to look back and aids in the future progression of a knowledge field, such as intellectual capital. More specifically, we answered two key research questions: first, we identified the general research trends within JIC i.e. the most productive authors, institutes and countries, most influential work, citation structure of JIC publications, etc.; question two (a, b and c) was about the extent and impact of intellectual capital knowledge in JIC by presenting the conceptual, intellectual and social structure of JIC publications. To answer these research questions, our analysis utilized the bibliometric indicators of JIC publications published during a twenty-year period i.e. 2000-2020.

Our data was analysed in two stages. In stage one we employed Bibliometrix R (Aria and Cuccurullo, 2017) to identify general trends and provide a description to the JIC research base. In stage two, we developed a knowledge structure by constructing strategic diagram using co-word analysis (Bibliometrix R by Aria and Cuccurullo, 2017), intellectual structure by

developing historiography map (employing Bibliometrix R by Aria and Cuccurullo, 2017), and co-citation and bibliographic coupling networks, and lastly social structure of the JIC research (employing VOSviwer by van Eck and Waltman, 2009).

Our key findings indicate that the impact of JIC is growing, both in terms the size of annual publications and the impact of these publication on the relevant research field. JIC has been cited almost 29,273 times and more than 7 percent of journal publications have received above 100 citations. The majority of JIC documents i.e. 93 percent have received at least one citation. For a young journal, with a very specific focus, this citation pattern depicts the stature of the journal. Further, JIC has been cited in other key journals, namely Journal of Knowledge Management, Management Decision, Journal of Cleaner Production, Expert Systems with Applications and so on, which also substantiates the standing of JIC among peer journal titles. In terms of geographical locations, Italy dominates the list, followed by Australia and USA. The most productive Institute is represented by Macquarie University, followed by McMaster University. The top rank in term of most influential paper of JIC is Bontis et al (2002) followed by Petty and Guthrie, (2000) and Bontis et al. (2002), whose work proposed and examined the intellectual capital-firm performance whereas Petty and Guthrie (2000) talk about reporting of intellectual capital. Interestingly, our further analysis (historiography map) reveals that these two pieces played a role in establishing the two important research streams in JIC. That said, our analysis is also suggesting newer areas of relevant research that are evolving. Analysis on the general description of JIC provides an understanding about the research patterns and leading trends within JIC. This will aid in helping the editorial board members of JIC and scholars' community to focus on topics, that are both core to them and also on less examined topical areas, that needs increased attention.

We also contribute through the understanding of the conceptual structure of the JIC research base, through a strategic diagram, which was constructed using co-word analysis of authors keyword. Our analysis suggests that almost all of JIC research can be structured into eight themes i.e. three general or basic themes (Intellectual Capital, Disclosure, and Intellectual Property), one motor theme (Universities), one partial motor and partial peripheral theme (Value Added), two peripheral themes (Strategy and, Value Creation), and one disappearing theme (Organizational Learning). These eight sub-concepts of the JIC research base offers an understanding of the central and well-developed topics, as well as the underdeveloped and emerging topics. This understanding thus provides direction for the potential extension of JIC research base. For example, research on Strategy and Value Creation themes has a potential to be extended in future.

Our next contribution was by aiding in understanding the disciplinary composition of the salient features of JIC knowledge base, through the intellectual structure of JIC publications. Here, three type of maps/network were constituted. *First*, we developed a Historiography map of the top 50 influential research papers of JIC. Our analysis reveals, that since its inception, JIC research included two major research themes i.e. intellectual capital & performance and, reporting & disclosure of intellectual capital. This analysis helps in understanding how the knowledge base within JIC has moved over time. For example, the research theme reporting has moved from voluntary reporting to structural framework of disclosure of intellectual capital.
Second, we employed a co-citation analysis of secondary documents to understand the intellectual foundation of JIC research base. We developed two co-citation networks i.e. sources and documents. Co-citation network of sources revealed three sets of knowledge bases i.e. accounting review, general & knowledge management, and books. JIC research was thus

earlier primarily rooted within the accounting research domain, however since then, it is being evolving by embracing newer forms of intellectual capital research, as it is still a new field of inquiry. The co-citation network of cited documents, in this paper, has identified two important research themes (through the historiography map). The historiography map provides an understanding about the evolution and historical progression of JIC research base. In the last two decades, intellectual capital research base is continuously expanding and is seeing an upgradation in terms of theories and application. Intellectual capital is thus adding value to firms as it helps them in achieving competitive advantage.

Third, to understand the future (emerging themes) of JIC, we developed a bibliographic coupling network of the most productive authors and most influential documents published in JIC. This analysis reveals possible future research themes for JIC, of which some key areas include- the disclosure practices for intellectual capital, role of intellectual capital in innovation, big data in intellectual capital, and integration of various theoretical framework in intellectual capital research. These findings would help in extending present and future intellectual capital research, in JIC, in a meaningful way. *Fourth*, we presented the current state of collaboration among scholars published/publishing in JIC, by developing a co-authorship network of scholars. The co-authorship network we developed, reveals the existence of various publishing teams within JIC. This may help authors working in this area to observe past collaborations, and help develop newer collaboration with others.

Finally, our study provides a guiding framework for organizations in designing policies and interventions for promoting the intellectual capital. Our research identifies important themes within the intellectual capital knowledge field as it establishes its relevance with firm performance- the bottom line for all managers. Thus, the knowledge detailed in this review is of great utility for executives and practitioners.

5. Conclusion & limitation

In conclusion, this paper offers a holistic view of the JIC knowledge base. Through this contribution, the information on various trends, themes, and research streams in JIC would be easily available for researchers. However, this study is also not free from certain limitations. We only analysed bibliometric information of papers and not the entire content. Although, it is assumed that keywords that were used usually represents the main content of the documents, there could however include certain limitations. Thus, an integration of this type of literature review with traditional review would enhance the overall capital of such studies. That said, we believe that this contribution aids intellectual capital scholars focus on impactful future research.

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Table 1. Citation Trends of JIC from 2000 to 2020

Year	NP	Citation	≥50	≥10	≥1	Mean TC per Art	Mean TC per Year	Citable Years	articles in other sources citing JIC
2000	24	3	0	0	2	132.66	6.63	20	3
2001	30	50	0	1	11	64.36	3.38	19	25
2002	26	51	0	0	30	72.88	4.04	18	31
2003	35	153	0	3	60	71.42	4.20	17	59
2004	38	297	0	5	114	85.07	5.31	16	116
2005	37	395	0	5	104	60.62	4.04	15	131
2006	44	425	0	6	134	33.15	2.36	14	166
2007	44	839	0	19	182	40.43	3.11	13	243
2008	42	916	0	25	195	34.11	2.84	12	261
2009	37	1101	0	25	251	35.10	3.19	11	281
2010	30	1452	1	36	288	46.26	4.62	10	320
2011	29	1422	0	33	300	44.34	4.92	9	401
2012	30	1624	0	50	347	32.76	4.09	8	373
2013	36	2061	1	49	322	34.638	4.94	7	475
2014	31	2268	1	56	359	23.32	3.88	6	482
2015	36	2549	2	63	366	25.66	5.13	5	554
2016	36	2370	1	64	371	17.138	4.28	4	618
2017	44	2928	4	80	401	15.75	5.25	3	703
2018	46	3489	4	102	429	8.30	4.15	2	782
2019	49	3848	5	116	434	1.51	1.51	1	1073
2020	13	1032	0	16	361	---	----	0	311
Total	737	29273	19	754	5061				7408

Source: Scopus databases accessed in 12.04.2020, NP: number of publications; ≥50, ≥10, ≥: number of papers with at least 50, 10 and 1 citations respectively;

Table 2. Top Authors, Institutions, Countries and Journals citing JIC articles

R	Author Name	TP	Institutes	TP	Country	TP	Journal	TP
1	Bontis, N.	77	McMaster University	192	United Kingdom	972	Journal of Intellectual Capital	562
2	Dumay, J.	76	Macquarie University	136	Italy	873	Journal of Knowledge Management	197
3	Guthrie, J.	62	University Teknologi Mara	106	United States	828	International journal of learning and Intellectual Capital	167
4	Cegarra-Navarro, J.G.	46	Lappeenranta-Lahti University of Technology LUT	102	Spain	783	Sustainability Switzerland	126
5	Grimaldi, M.	34	Universiti Utara Malaysai	79	Australia	765	Knowledge management research and practice	100
6	Kianto, A.	33	The University of Sydney	78	Malaysia	589	Management decision	90
7	Schiuma, G.	33	University of Padua	74	China	456	Journal of Information and Knowledge Management	68
8	Serenko, A.	32	Tampere University of Technology	73	Taiwan	416	Measuring Business Excellence	66
9	Roos, G.	31	Polytechnic University of Cartagena	64	Finland	388	Knowledge and Process Management	56
10	Kong, E.	30	Bucharest University of Economic Studies	63	Canada	365	Journal of Business Research	52
11	Cricelli, L.	29	RMIT University	60	India	313	Meditari Accountancy Research	46
12	Bolisani, E.	28	University of Cassino	59	Iran	313	International Journal of Productivity Performance and Management	42

R	Author Name	TP	Institutes	TP	Country	TP	Journal	TP
13	Secundo, G.	28	University of Castilla-La Mancha: Ciudad Real Campus	58	Germany	229	Accounting Auditing and Accountability Journal	41
14	Kasemsap, K.	27	National Research University	56	Portugal	264	Corporate Ownership and Control	41
15	Bratianu, C.	25	University of Calabria	54	Indonesia	256	Espacios	41
16	Durst, S..	25	Cranfield School of Management	54	Brazil	231	International Journal of Technology Management	41
17	Lonnqvist, A.	25	University of Beira Interior	53	France	191	Technological Forecasting and Social Change	40
18	Abeysekera, I.	24	University of Technology Malaysia	53	Netherlands	131	International Journal of Knowledge-based Development	39
19	Akhavan, P.	24	University of Salento	53	Sweden	170	Journal of Cleaner Production	38
20	Nielsen, C.	24	University of Malaya	50	Thailand	166	Vine	38
21	Veltri, S.	23	Hong Kong Polytechnic University	50	South Africa	161	Expert Systems with Applications	37
22	Massaro, M.	22	University of Science, Malaysia	49	Russian Federation	159	Learning organization	37
23	Cocosila, M.	21	Sapienza University of Rome	49	New Zealand	143	International journal of innovation management	35
24	Joia, L.A.	20	University of Vigo	48	Pakistan	136	Journal of Business Ethics	

R	Author Name	TP	Institutes	TP	Country	TP	Journal	TP
25	Marr, B.	20	Islamic Azad University	48	Poland	129	Intangible capital	

Source: authors compilation from Scopus

Table 3. Most productive authors in JIC and their Citation Structure

R	Author	Affiliation	NP	PY Start	TC	H index	G index	M index	Number of articles ≥100	≥50	≥20	≥10	≥5
1	DUMAY J	Macquarie University, Australia	29	2011	1118	18	29	1.8	3	8	9	5	3
2	BONTIS N	McMaster University, Canada	26	2000	2226	20	26	0.95	3	6	10	3	0
3	GUTHRIE J	Macquarie University, Australia	18	2000	2303	16	18	0.76	5	2	7	2	0
4	ROOS G	University of South Australia, Australia	10	2001	372	8	10	0.4	0	3	3	2	1
5	CHATZKEL J	Jay Chatzkel Progressive Practices, Virginia, USA	10	2000	242	6	10	0.28	1	0	2	2	4
6	ABEYSEKERA I	Charles Darwin University, Australia	7	2006	421	7	7	0.46	0	5	2	0	0
7	MOURITSEN J	Copenhagen Business School, Denmark	7	2001	402	7	7	0.35	1	2	1	1	1
8	SECUNDO G	University of Salento, Italy	7	2010	290	7	7	0.63	0	3	2	2	0
9	JOHANSON U	Karolinska Institute, Stockholm, Sweden	7	2003	230	7	7	0.38	0	1	4	2	0
10	GIULIANI M	Marche Polytechnic University, Italy	7	2009	139	6	7	0.5	0	0	2	4	1
11	BUKH PN	University of Aarhus, Aarhus, Denmark	6	2001	382	6	6	0.3	1	1	3	0	0
12	EDVINSSON L	Lund University, Lund, Sweden	6	2000	291	6	6	0.28	0	3	2	1	0
13	BOUNFOUR A	University of Paris-Sud, France	6	2003	132	3	6	0.16	0	0	1	1	1
14	NIELSEN C	Aalborg University, Denmark	6	2006	119	6	6	0.4	0	0	3	2	1
15	CRICELLI L	University of Cassino and Southern	6	2012	116	4	6	0.44	0	1	2	0	0

R	Author	Affiliation	NP	Year	TC	h		C/P	≥100	≥50	≥20	≥10	≥5
		Lazio, Cassino, Italy											
16	GRIMALDI M	University of Cassino and Southern Lazio, Italy	6	2012	116	4	6	0.44	0	1	2	0	0
17	PETTY R	Macquarie University, Australia	5	2000	1718	5	5	0.23	4	0	1	0	0
18	MARR B	Cranfield University, UK	5	2003	564	5	5	0.27	3	0	2	0	0
19	SCHIUMA G	University of Basilicata, Italy	5	2004	351	5	5	0.29	1	1	2	1	0
20	ANDRIESSEN D	HU University of Applied Sciences Utrecht, Netherlands	5	2001	326	4	5	0.2	1	1	2	0	0
21	PIKE S	Intellectual Capital Services Ltd, UK	5	2001	300	5	5	0.25	0	4	1	0	0
22	DAVEY H	University of Waikato, New Zealand	5	2009	205	5	5	0.41	0	2	1	2	0
23	O DONNELL D	The Intellectual Capital Research Institute of Ireland, Ireland	5	2000	179	Na	Na	Na	0	1	4	0	0
24	KONG E	University of Southern Queensland, Australia	5	2007	171	5	5	0.35	0	1	3	1	0
25	LNNQVIST A	Tampere University, Finland	5	2007	164	5	5	0.35	0	1	3	1	0
26	CHIUCCHI MS	Marche Polytechnic University, Italy	5	2013	121	5	5	0.625	0	0	4	2	1
27	ABHAYAWANSA S	Swinburne University of Technology, Australia	5	2009	66	3	5	0.25	0	0	3	1	0

R= Rank; NP: Total publication in JIC; TC: Total citations; C/P: Citation per publication; h: h- index; ≥100, ≥50, ≥20, ≥10, ≥5,: Number of articles with at least 100, 50, 20, 10, and 5 citations respectively.

Table 4. The 25 Most influential paper published in JIC

R	Article title	Author/s	TC	Year	C/Y
1	Intellectual capital and business performance in Malaysian industries	Bontis, N., William Chua Chong, K., Richardson, S.	725	2000	34.381
2	Intellectual capital literature review: Measurement, reporting and management	Petty, R., Guthrie, J.	629	2000	29.76
3	An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance	Chen, M.-C., Cheng, S.-J., Hwang, Y.	486	2005	30.25
4	Using content analysis as a research method to inquire into intellectual capital reporting	Guthrie, J., Petty, R., Yongvanich, K., Ricceri, F.	482	2004	28.23
5	A knowledge-based theory of the firm to guide in strategy formulation	Sveiby, K.-E.	417	2001	20.8
6	Intellectual capital: Australian annual reporting practices	Guthrie, J., Petty, R.	374	2000	17.76
7	Examining the link between knowledge management practices and types of innovation	Darroch, J., Mcnaughton, R.	365	2002	19.21
8	Intellectual capital and traditional measures of corporate performance	Firer, S., Mitchell Williams, S.	358	2003	19.83
9	Intellectual capital ROI: A causal map of human capital antecedents and consequents	Bontis, N., Fitz-enz, J.	354	2002	18.63
10	Measuring intellectual capital: A new model and empirical study	Chen, J., Yuan Xie, H.	303	2004	17.82
11	National Intellectual Capital Index: A United Nations initiative for the Arab region	Bontis, N.	296	2004	17.41

12	Italian annual intellectual capital disclosure: An empirical analysis	Bozzolan, S., Favotto, F., Ricceri, F.	280	2003	15.50
13	Difficulties in diffusion of tacit knowledge in organizations	Haldin-Herrgard, T.	263	2000	12.52
14	Intellectual capital and firm performance of US multinational firms: A study of the resource-based and stakeholder views	Riahi-Belkaoui, A.	230	2003	12.77
15	Value network analysis and value conversion of tangible and intangible assets	Allee, V.	229	2007	17.61
16	Intellectual capital and financial returns of companies	Tan, H.P., Plowman, D., Hancock, P.	229	2008	15.92
17	The voluntary reporting of intellectual capital: Comparing evidence from Hong Kong and Australia	Guthrie, J., Petty, R., Ricceri, F.	214	2006	14.2
18	Intellectual capital and performance in causal models. Evidence from the information technology industry in Taiwan	Wang, W.-Y., Chang, C.	210	2005	13.12
19	Analysing value added as an indicator of intellectual capital and its consequences on company performance	Zéghal, D., Maaloul, A.	209	2010	18.90
20	The dynamics of value creation: Mapping your intellectual performance drivers	Marr, B., Neely, A., Schiuma, G.	203	2004	11.94
21	Why do firms measure their intellectual capital?	Marr, B., Gray, D., Neely,A.	202	2003	11.22
22	The management, measurement and the reporting of intellectual capital	Guthrie, J.	199	2001	9.90
23	Is intellectual capital performance and disclosure practices related?	Mitchell Williams, S.	192	2001	9.55
24	IC valuation and measurement: Classifying the state of the art	Andriessen, D.	188	2004	11.05
25	The impact of intellectual capital on firms' market value and financial performance	Maditinos, D., Chatzoudes, D., Tsairidis, C., Theriou, G.	185	2011	18.40

Notes: R= Rank; TC= Total citations; C/Y= Citations per year.

Table 5: Most cited article in JIC from 2000-2020

Rank	Article	Author	Journal	YoP	Citations
1	INTELLECTUAL CAPITAL: AN EXPLORATORY STUDY THAT DEVELOPS MEASURES AND MODELS	BONTIS, N.,	MANAGEMENT DECISION	1998	109
2	INTELLECTUAL CAPITAL LITERATURE REVIEW: MEASUREMENT, REPORTING AND MANAGEMENT	PETTY, R., GUTHRIE, J.,	JOURNAL OF INTELLECTUAL CAPITAL	2000	74
3	ASSESSING KNOWLEDGE ASSETS: A REVIEW OF THE MODELS USED TO MEASURE INTELLECTUAL CAPITAL	BONTIS, N.,	INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS	2001	69
4	INTELLECTUAL CAPITAL: AUSTRALIAN ANNUAL REPORTING PRACTICES	GUTHRIE, J., PETTY, R.,	JOURNAL OF INTELLECTUAL CAPITAL	2000	58
5	INTELLECTUAL CAPITAL RESEARCH: A CRITICAL EXAMINATION OF THE THIRD STAGE	DUMAY, J., GARANINA, T.,	JOURNAL OF INTELLECTUAL CAPITAL	2013	56
6	DEVELOPING INTELLECTUAL CAPITAL AT SKANDIA	EDVINSSON, L.,	LONG RANGE PLANNING	1997	42
7	A CRITICAL REFLECTION ON THE FUTURE OF INTELLECTUAL CAPITAL: FROM REPORTING TO DISCLOSURE	DUMAY, J.,	JOURNAL OF INTELLECTUAL CAPITAL	2016	41
8	USING CONTENT ANALYSIS AS A RESEARCH METHOD TO INQUIRE INTO INTELLECTUAL CAPITAL REPORTING	GUTHRIE, J., PETTY, R., YONGVANICH, K., RICCERI, F.,	JOURNAL OF INTELLECTUAL CAPITAL	2004	41
9	PROBLEMATISING INTELLECTUAL CAPITAL RESEARCH: OSTENSIVE VERSUS PERFORMATIVE IC	MOURITSEN, J.,	ACCOUNTING, AUDITING & ACCOUNTABILITY JOURNAL	2006	41
10	SOCIAL CAPITAL, INTELLECTUAL CAPITAL, AND THE ORGANIZATIONAL ADVANTAGE (1998), 23 (2), PP. 242-266	NAHAPIET, J., GHOSHAL, S.,	ACADEMY OF MANAGEMENT REVIEW	1998	38

11	THE INFLUENCE OF INTELLECTUAL CAPITAL ON THE TYPES OF INNOVATIVE CAPABILITIES	SUBRAMANIAM, M., YOUNDT, M.A.,	ACADEMY OF MANAGEMENT JOURNAL	2005	36
12	DEVELOPING A MODEL FOR MANAGING INTELLECTUAL CAPITAL	EDVINSSON, L., SULLIVAN, P.,	EUROPEAN MANAGEMENT JOURNAL	1996	35
13	INTELLECTUAL CAPITAL AND TRADITIONAL MEASURES OF CORPORATE PERFORMANCE	FIRER, S., WILLIAMS, S.M.,	JOURNAL OF INTELLECTUAL CAPITAL	2003	35
14	REFLECTIONS AND PROJECTIONS: A DECADE OF INTELLECTUAL CAPITAL ACCOUNTING RESEARCH	GUTHRIE, J., RICCERI, F., DUMAY, J.,	THE BRITISH ACCOUNTING REVIEW	2012	32
15	THE PROJECT OF INTELLECTUAL CAPITAL DISCLOSURE: RESEARCHING THE RESEARCH	ABEYSEKERA, I.,	JOURNAL OF INTELLECTUAL CAPITAL	2006	31
16	NATIONAL INTELLECTUAL CAPITAL INDEX: A UNITED NATIONS INITIATIVE FOR THE ARAB REGION	BONTIS, N.,	JOURNAL OF INTELLECTUAL CAPITAL	2004	31
17	ITALIAN ANNUAL INTELLECTUAL CAPITAL DISCLOSURE: AN EMPIRICAL ANALYSIS	BOZZOLAN, S., FAVOTTO, F., RICCERI, F.,	JOURNAL OF INTELLECTUAL CAPITAL	2003	31
18	REPORTING INTELLECTUAL CAPITAL IN ANNUAL REPORTS: EVIDENCE FROM IRELAND (2001)	BRENNAN, N.,	ACCOUNTING, AUDITING & ACCOUNTABILITY JOURNAL	2001	31
19	THE VOLUNTARY REPORTING OF INTELLECTUAL CAPITAL: COMPARING EVIDENCE FROM HONG KONG AND AUSTRALIA (2006)	GUTHRIE, J., PETTY, R., RICCERI, F.,	JOURNAL OF INTELLECTUAL CAPITAL	2006	31
20	GRAND THEORIES AS BARRIERS TO USING IC CONCEPTS	DUMAY, J.,	JOURNAL OF INTELLECTUAL CAPITAL	2012	29
21	THE DYNAMICS OF VALUE CREATION: MAPPING YOUR INTELLECTUAL PERFORMANCE DRIVERS (2004)	MARR, B., SCHIUMA, G., NEELY, A.,	JOURNAL OF INTELLECTUAL CAPITAL	2004	29

22	AN EMPIRICAL INVESTIGATION OF ANNUAL REPORTING TRENDS OF INTELLECTUAL CAPITAL IN SRI LANKA (2005)	ABEYSEKERA, I., GUTHRIE, J.,	CRITICAL PERSPECTIVES ON ACCOUNTING	2005	28
23	THE MANAGEMENT, MEASUREMENT AND THE REPORTING OF INTELLECTUAL CAPITAL	GUTHRIE, J.,	JOURNAL OF INTELLECTUAL CAPITAL	2001	27
24	INTELLECTUAL CAPITAL PROFILES: AN EXAMINATION OF INVESTMENTS AND RETURNS	YOUNDT, M.A., SUBRAMANIAM, M., SNELL, S.A.,	JOURNAL OF MANAGEMENT STUDIES	2004	27
25	INTELLECTUAL CAPITAL ROI: A CAUSAL MAP OF HUMAN CAPITAL ANTECEDENTS AND CONSEQUENTS	BONTIS, N., FITZ-ENZ, J.,	JOURNAL OF INTELLECTUAL CAPITAL	2002	26

Source: Scopus database; R= Rank; TC= Total citations; and TLS=Total link strength, YoP: year of publication.

Table 6. Most Productive Institutions, Countries and Keywords (frequency) in JIC

R	University/Organization	TP	TC	Country	TP	TC	Authors Key Words	Frequency
1	Macquarie University	44	3158	Italy	120	5845	Intellectual Capital	503
2	McMaster University	27	2296	Australia	109	4324	Intangible Asset	120
3	The university of Sydney	17	1195	United States	84	3605	Knowledge Management	85
4	Cranfield school of management	13	915	United Kingdom	68	2108	Human Capital	70
5	University of Ferrara	13	189	Spain	66	2605	Disclosure	54
6	Autonomous University of Madrid	12	669	Canada	49	3896	Innovation	44
7	Marche Polytechnic University	12	281	Taiwan	30	1503	Measurement	36

R	University/Organization	TP	TC	Country	TP	TC	Authors Key Words	Frequency
8	National Research University Higher School of Economics	12	109	Sweden	28	845	Intellectual Property	28
9	National Chengchi University	10	929	Malaysia	26	1629	Integrated reporting	22
10	University of Bologna	9	208	Finland	25	1645	Financial performance	21
11	University of Cassino	9	191	India	21	881	Financial reporting	20
12	Multimedia University	8	1182	New Zealand	20	1111	Content analysis	18
13	Copenhagen Business School	8	453	Russian Federation	20	477	Social capital	18
14	Lappeenranta-Lahti University of Technology LUT	8	440	Denmark	17	675	Knowledge	17
15	University of Salento	8	296	Portugal	16	207	Strategic management	17
16	University of Wollongong	8	277	Netherlands	15	654	Annual reports	16
17	University of Vigo	8	197	Germany	15	588	Business performance	16
18	Aalborg University	8	189	Austria	14	343	Intellectual capital reporting	16
19	Sapienza University of Rome	8	187	France	14	339	Performance	16
20	Swinburne University of Technology	8	104	Hong Kong	12	1401	Relational capital	16
21	University of Padua	7	1049	Brazil	12	296	Intangibles	15
22	University of Waikato	7	294	Ireland	11	441	Intellectual capital disclosure	15
23	Cranefield University	7	289	South Africa	11	716	Competitive advantage	13

R	University/Organization	TP	TC	Country	TP	TC	Authors Key Words	Frequency
24	Mälardalen University	7	231	China	7	343	Value added	13
25	University of Castilla-La Mancha: Ciudad Real Campus	7	219	Iran	7	138	Non-profit organizations	12

Source: Scopus data base, TC: total citation, TP: total publication

R	University/Organization	TP	TC	Country	TP	TC	Authors Key Words	Frequency

Table 7: Top 50 articles included in historiograph

Paper	DOI	Year	LCS	GCS
GUTHRIE J, 2000, J INTELLECT CAP	10.1108/14691930010350800	2000	78	373
BRENNAN N, 2000, J INTELLECT CAP	10.1108/14691930010350792	2000	31	159
BONTIS N, 2000, J INTELLECT CAP	10.1108/14691930010324188	2000	70	722
SVEIBY KE, 2001, J INTELLECT CAP	10.1108/14691930110409651	2001	19	416
GUTHRIE J, 2001, J INTELLECT CAP	10.1108/14691930110380473	2001	31	198
BONTIS N, 2002, J INTELLECT CAP	10.1108/14691930210435589	2002	31	354
FIRER S, 2003, J INTELLECT CAP	10.1108/14691930310487806	2003	57	357
BOUNFOUR A, 2003, J INTELLECT CAP	10.1108/14691930310487833	2003	17	82
APRIL KA, 2003, J INTELLECT CAP	10.1108/14691930310472794	2003	25	123
KAUFMANN L, 2004, J INTELLECT CAP	10.1108/14691930410550354	2004	22	140
MARR B, 2004, J INTELLECT CAP	10.1108/14691930410533722	2004	35	203
ANDRIESSEN D, 2004, J INTELLECT CAP	10.1108/14691930410533669	2004	23	188
GUTHRIE J, 2004, J INTELLECT CAP	10.1108/14691930410533704	2004	50	480
MARR B, 2004, J INTELLECT CAP-a	10.1108/14691930410533650	2004	23	110
MAVRIDIS DG, 2004, J INTELLECT CAP	10.1108/14691930410512941	2004	19	120
BONTIS N, 2004, J INTELLECT CAP	10.1108/14691930410512905	2004	36	296
CHEN J, 2004, J INTELLECT CAP	10.1108/14691930410513003	2004	27	303
ABDOLMOHAMMADI MJ, 2005, J INTELLECT CAP	10.1108/14691930510611139	2005	24	136
GHO PC, 2005, J INTELLECT CAP	10.1108/14691930510611120	2005	26	166
WANG WY, 2005, J INTELLECT CAP	10.1108/14691930510592816	2005	23	210
CHEN MC, 2005, J INTELLECT CAP	10.1108/14691930510592771	2005	35	484
GUTHRIE J, 2006, J INTELLECT CAP	10.1108/14691930610661890	2006	36	213
ABEYSEKERA I, 2006, J INTELLECT CAP	10.1108/14691930610639778	2006	37	96
NAZARI JA, 2007, J INTELLECT CAP	10.1108/14691930710830774	2007	18	93
KUJANSIVU P, 2007, J INTELLECT CAP	10.1108/14691930710742844	2007	17	69
TAN HP, 2007, J INTELLECT CAP	10.1108/14691930710715079	2007	34	223
TAN HP, 2008, J INTELLECT CAP	10.1108/14691930810913177	2008	19	96

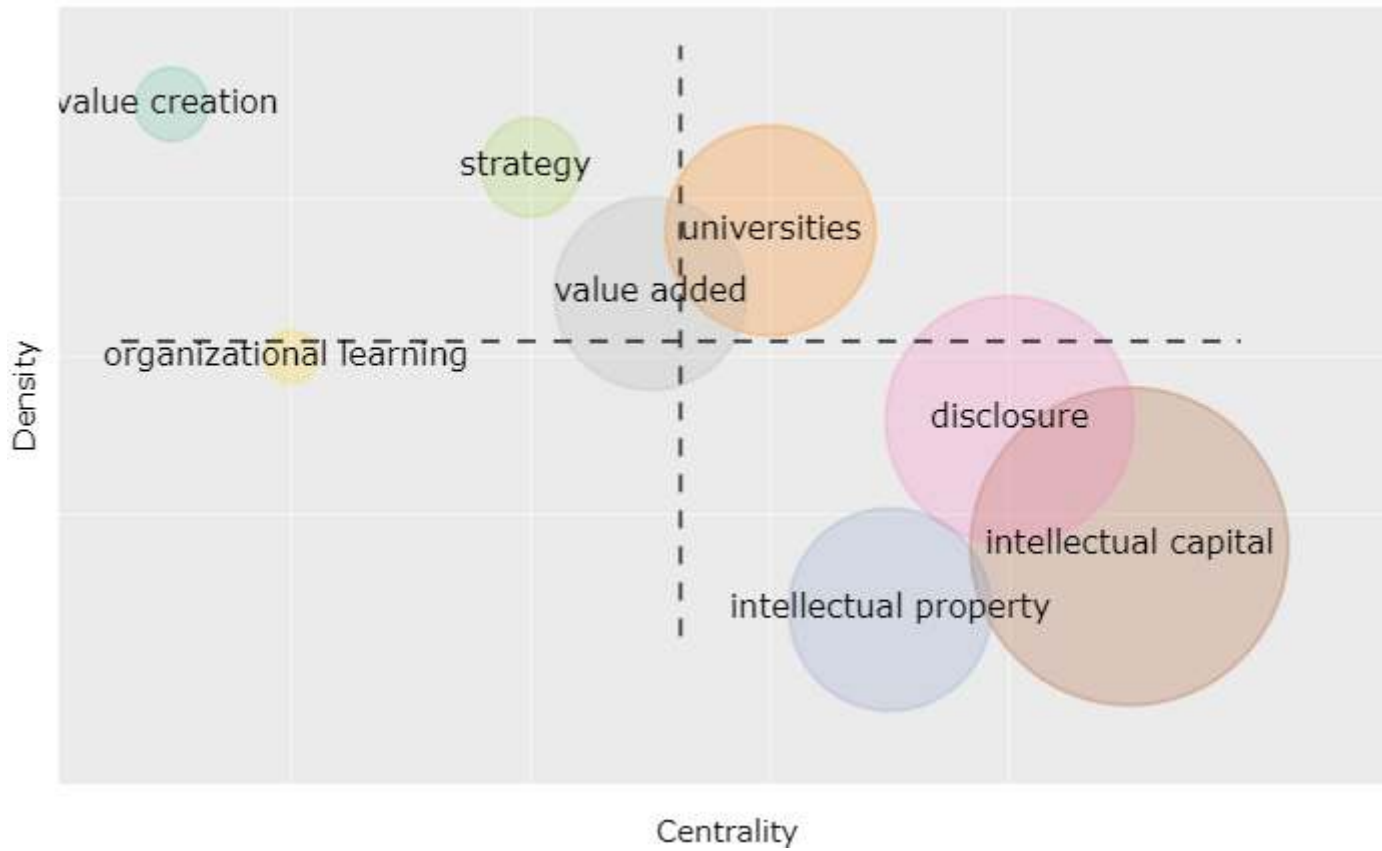|				
CHOONG KK, 2008, J INTELLECT CAP	10.1108/14691930810913186	2008	19	107
BHARATHI KAMATH G, 2008, J INTELLECT CAP	10.1108/14691930810913221	2008	28	125
SCHNEIDER A, 2008, J INTELLECT CAP	10.1108/14691930810892036	2008	19	63
BISMUTH A, 2008, J INTELLECT CAP	10.1108/14691930810870319	2008	24	62
DUMAY JC, 2009, J INTELLECT CAP	10.1108/14691930910996607	2009	26	56
TING IWK, 2009, J INTELLECT CAP	10.1108/14691930910996661	2009	21	141
DUMAY JC, 2009, J INTELLECT CAP-a	10.1108/14691930910952614	2009	51	149
SCHEZ MP, 2009, J INTELLECT CAP	10.1108/14691930910952687	2009	20	79
BEZHANI I, 2010, J INTELLECT CAP	10.1108/14691931011039679	2010	19	57
ZGHAL D, 2010, J INTELLECT CAP	10.1108/14691931011013325	2010	30	208
CLARKE M, 2011, J INTELLECT CAP	10.1108/14691931111181706	2011	24	144
ST-PIERRE J, 2011, J INTELLECT CAP	10.1108/14691931111123395	2011	18	60
JARDON CM, 2012, J INTELLECT CAP	10.1108/14691931211276098	2012	19	71
DUMAY JC, 2012, J INTELLECT CAP	10.1108/14691931211196187	2012	43	91
JOSHI M, 2013, J INTELLECT CAP	10.1108/14691931311323887	2013	17	80
DUMAY J, 2013, J INTELLECT CAP-a	10.1108/14691931311288986	2013	24	70
DUMAY J, 2013, J INTELLECT CAP-a-b	10.1108/14691931311288995	2013	63	180
EDVINSSON L, 2013, J INTELLECT CAP	10.1108/14691931311289075	2013	28	87
DUMAY J, 2014, J INTELLECT CAP	10.1108/JIC-01-2014-0010	2014	25	78
DUMAY J, 2014, J INTELLECT CAP-a	10.1108/JIC-09-2013-0098	2014	27	79
INKINEN H, 2015, J INTELLECT CAP	10.1108/JIC-01-2015-0002	2015	22	90
DENOPOLJAC V, 2016, J INTELLECT CAP	10.1108/JIC-07-2015-0068	2016	18	52
DUMAY J, 2016, J INTELLECT CAP	10.1108/JIC-08-2015-0072	2016	43	142

Figure 1: Publications trend over years

Figure 2: Strategic Diagram of Conceptual Structure of JIC Scholarships

Historical Direct Citation Network

wang wy, 2005
choong kk, 2008
st-pierre j, 2011
nazari ja, 2007
bharathi kamath g, 2008
tan hp, 2007
kujansivu p, 2007
chen j, 2004
gho pc, 2005
denopoljac v, 2016
bontis n, 2000
clarke m, 2011
joshi m, 2013
ting iwk, 2009
bontis n, 2002
firer s, 2003
jardon cm, 2012
inkinen h, 2015
zghal d, 2010
mavridis dg, 2004
tan hp, 2008
chen mc, 2005
bounfour a, 2003
abdolmohammadi mj, 2005
bismuth a, 2008
sveiby ke, 2001
dumay j, 2014
guthrie j, 2000
guthrie j, 2004
bezhani i, 2010
dumay j, 2013
marr b, 2004
dumay j, 2014
april ka, 2003
marr b, 2004
dumay jc, 2009
dumay jc, 2012
dumay j, 2013
dumay j, 2016
guthrie j, 2001
bontis n, 2004
abeysekera i, 2006
dumay jc, 2009
andriessen d, 2004
edvinsson l, 2013
brennan n, 2000
guthrie j, 2006
schneider a, 2008
kaufmann l, 2004

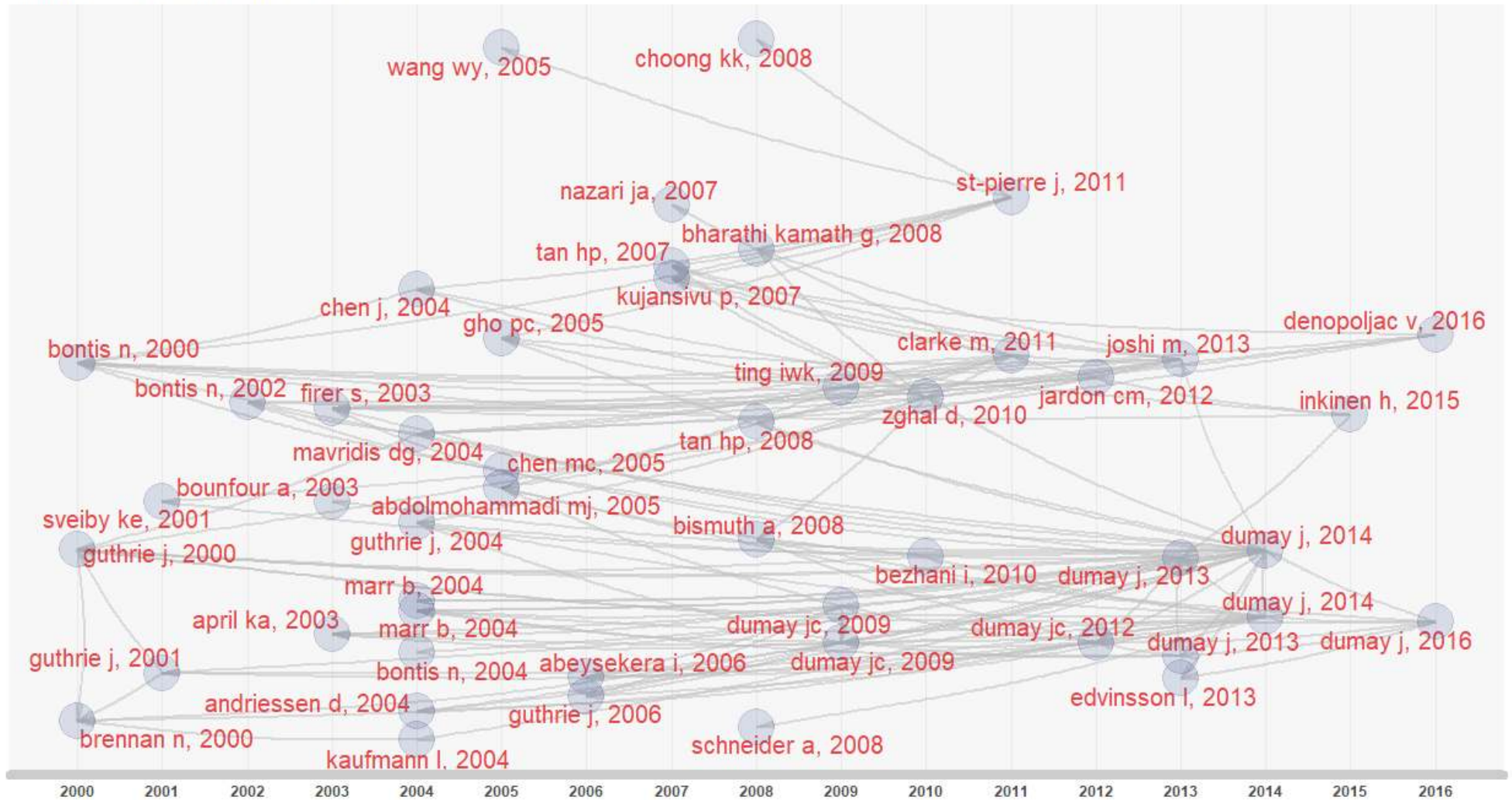2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

Figure 3 Historiograph map of most influential papers published in JIC

Figure 4 Co-citation network of top 100 linked sources in JIC

clarke, m., seng, d., whiting, r.h., intellectual capital and firm performance in australia (2011) j

firer, s., williams, s.m., intellectual capital and traditional measures of corporate performance (2

bontis, n., intellectual capital: an exploratory study that develops measures and models (1998) mana

nahapiet, j., ghoshal, s., social capital, intellectual capital, and the organizational advantage (1

mavridis, d.g., the intellectual capital performance of the japanese banking sector (2004) journal o

stahle, p., stahle, s., aho, s., value added intellectual coefficient (vaic): a critical analysis (2

kianto, a., what do we really mean by the dynamic dimension of intellectual capital? (2007) internat

brennan, n., connell, b., intellectual capital: current issues and policy implications (2000) journa

petty, r., guthrie, j., intellectual capital literature review: measurement, reporting and managemen

edvinsson, l., ic 21: reflections from 21 years of ic practice and theory (2013) journal of intellec

guthrie, j., ricceri, f., dumay, j., reflections and projections: a decade of intellectual capital a

dumay, j., intellectual capital measurement: a critical approach (2009) journal of intellectual capi

guthrie, j., petty, r., intellectual capital: australian annual reporting practices (2000) journal o

guthrie, j., petty, r., yongvanich, k., ricceri, f., using content analysis as a research method to

abeysekera, i., a template for integrated reporting (2013) journal of intellectual capital, 14 (2),

bozzolan, s., favotto, f., ricceri, f., italian annual intellectual capital disclosure: an empirical

striukova, l., unerman, j., guthrie, j., corporate reporting of intellectual capital: evidence from

beattie, v., thomson, s.j., lifting the lid on the use of content analysis to investigate intellectu
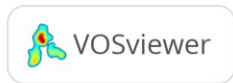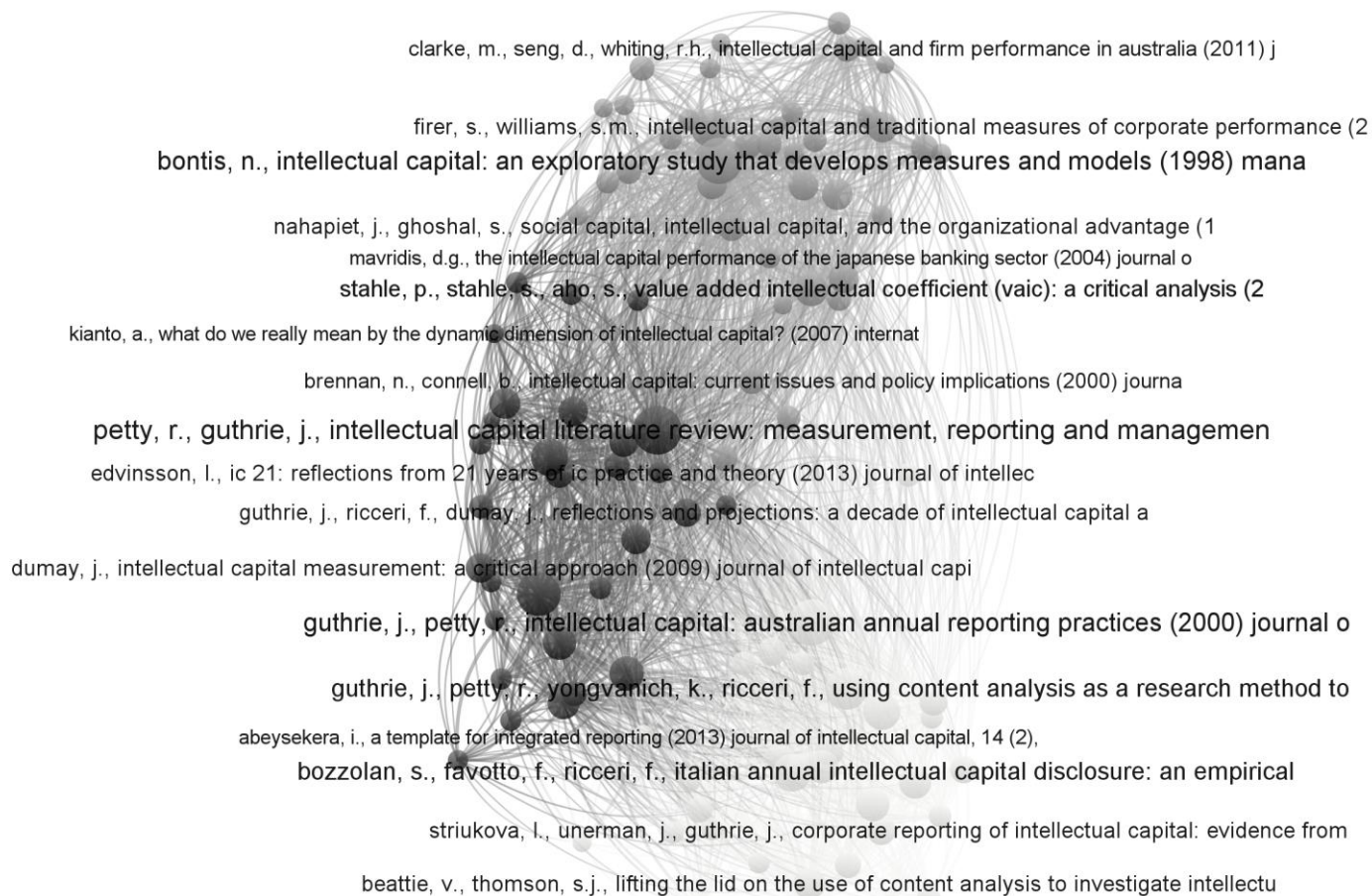
VOSviewer

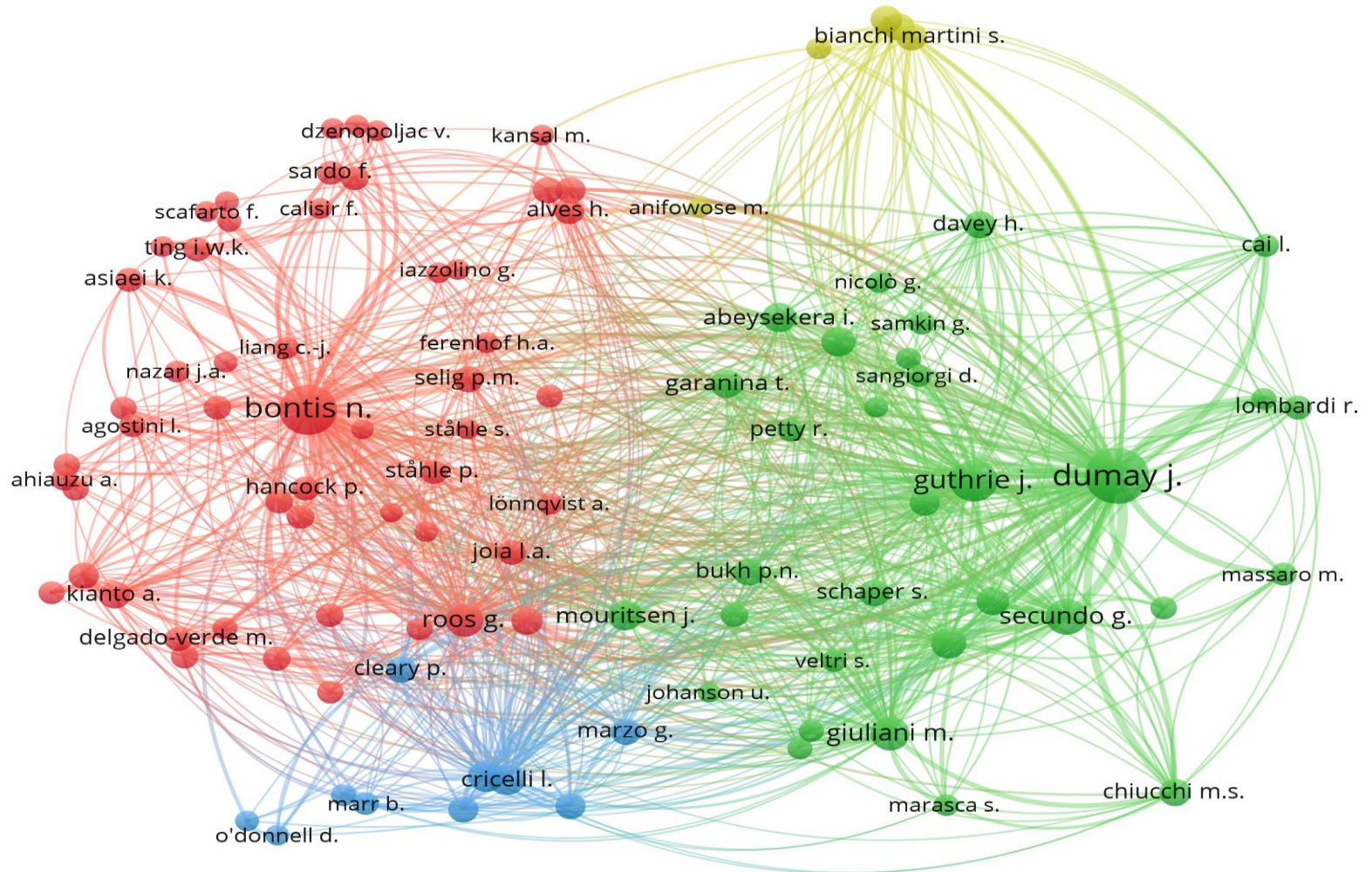Figure 5 Co-citation analysis of cited documents

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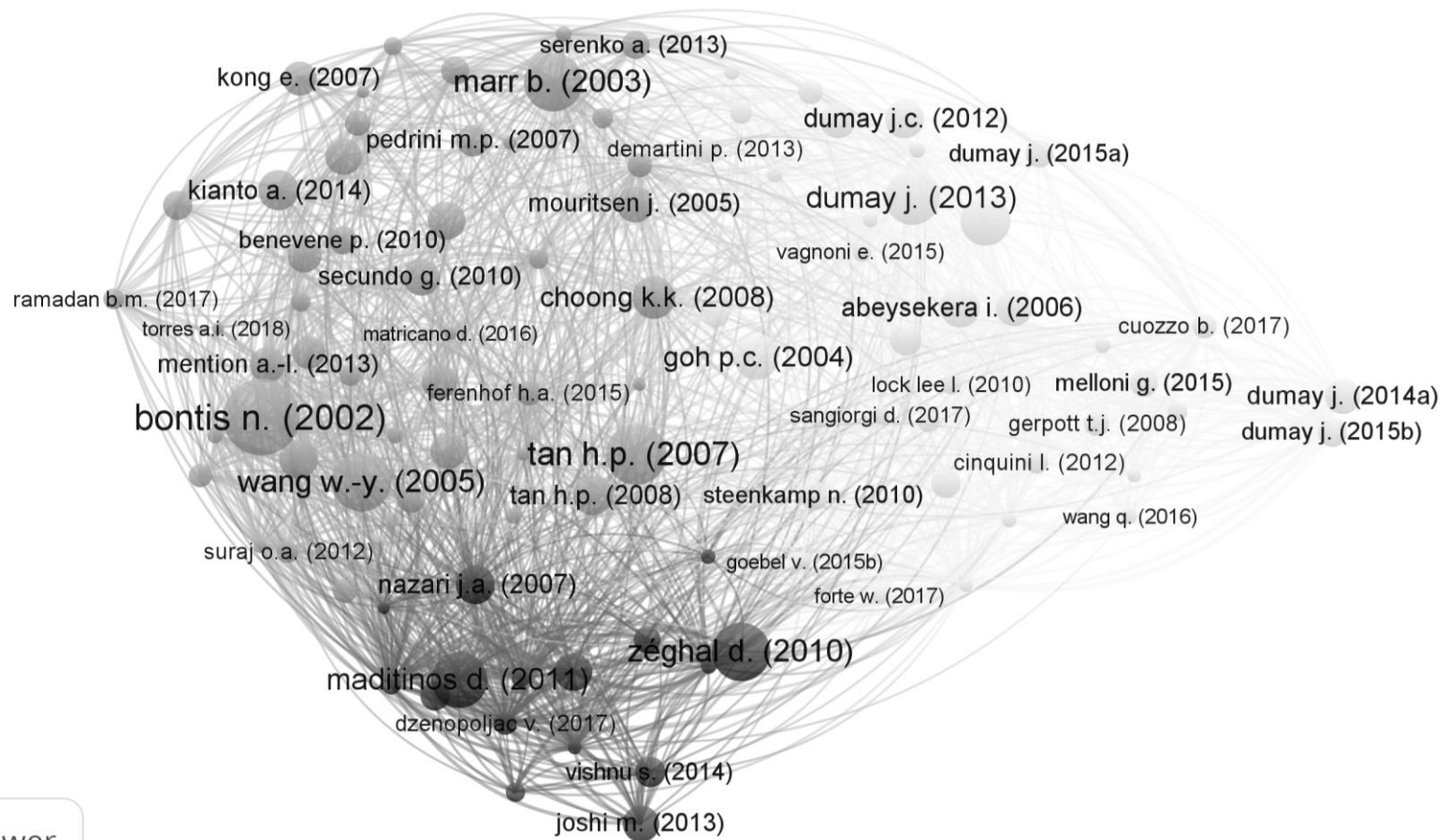Figure 6 Bibliographic Coupling of Authors in JIC

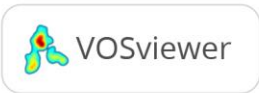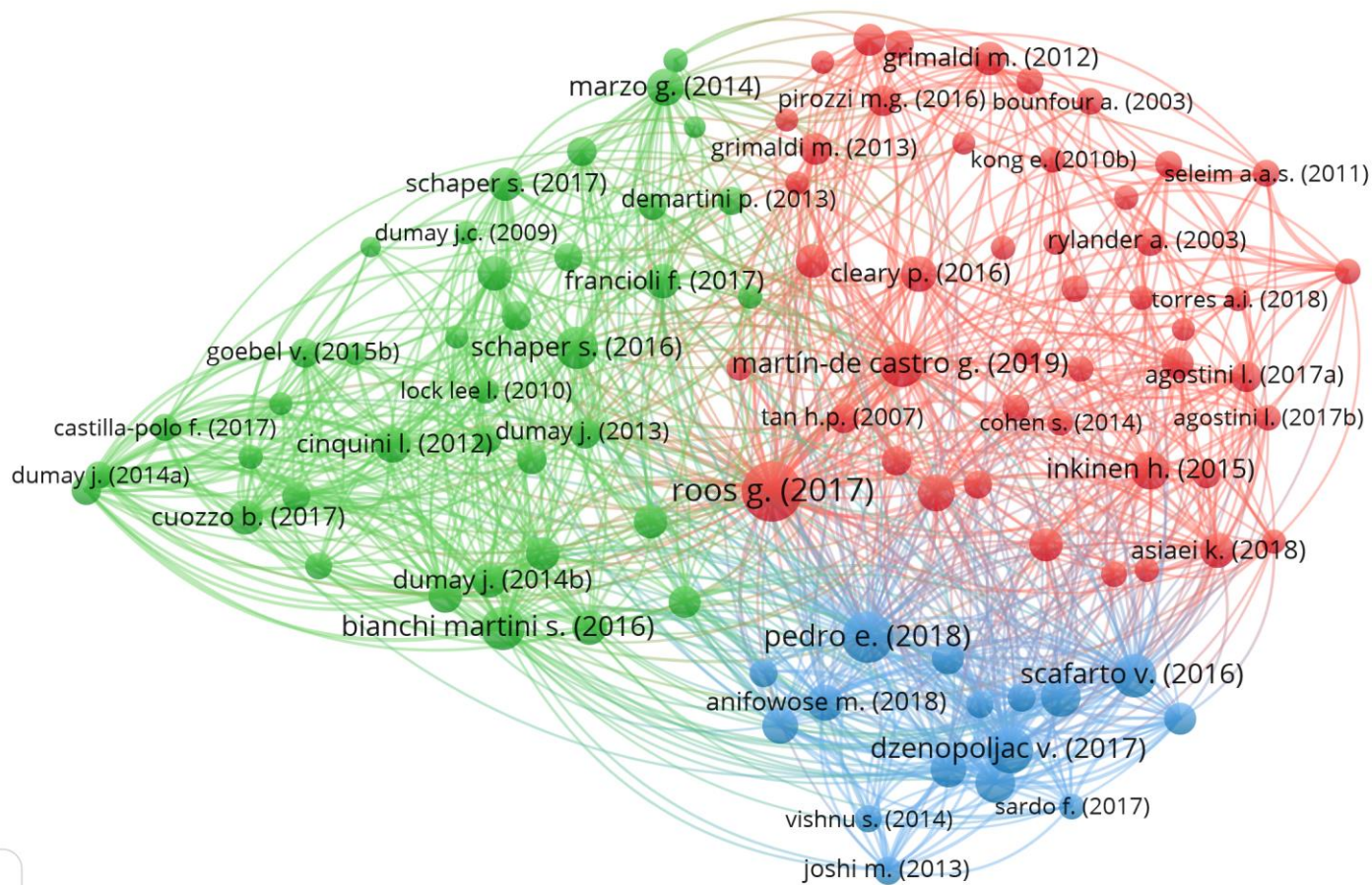Figure 7 Bibliographic coupling of documents published in JIC
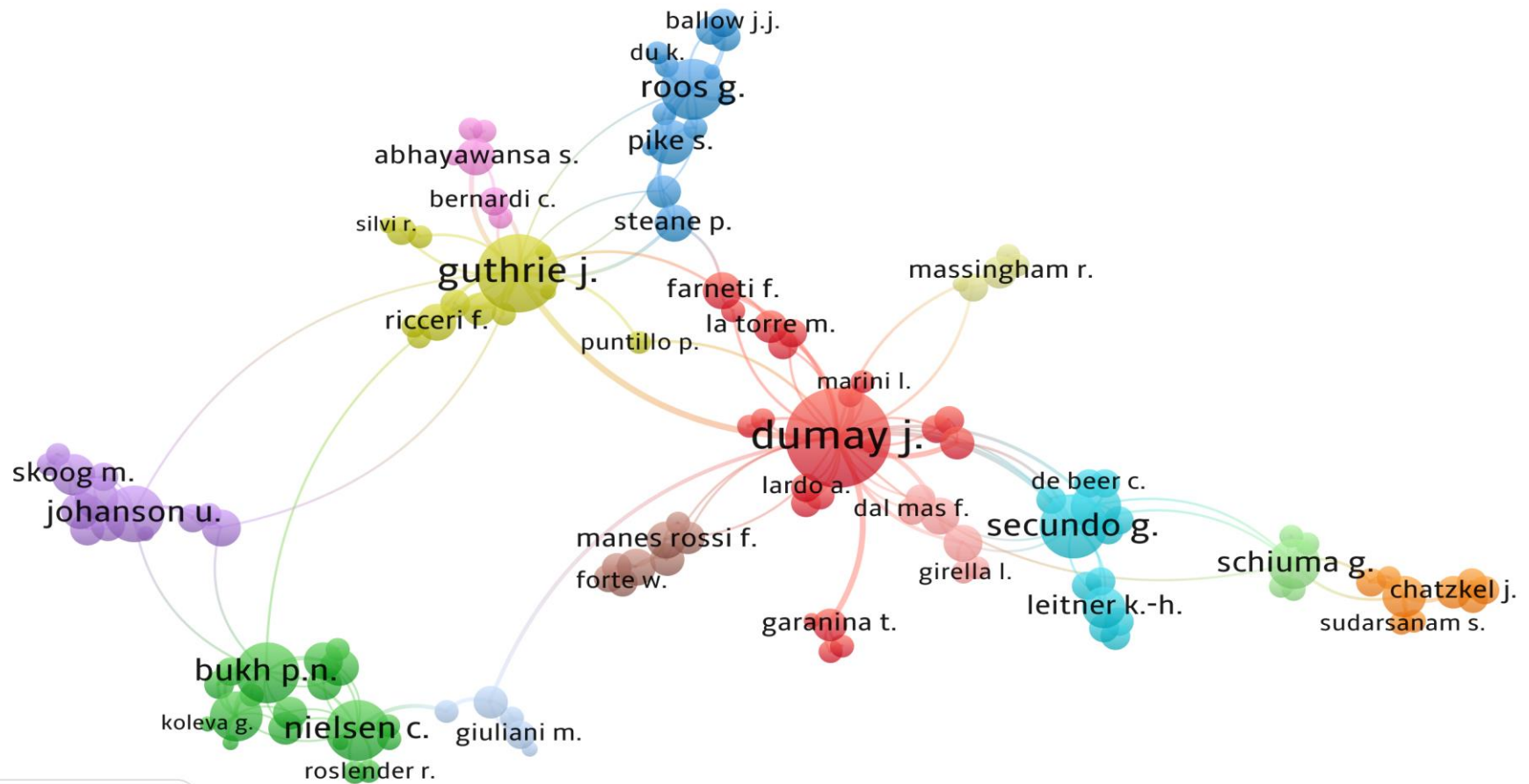
Figure 7 Bibliographic coupling of documents published in JIC

Figure 8 Collaboration network among authors in JIC