Research Trend Of Working Capital Management

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ARTICLE INFO	ABSTRACT
	Given the importance of working capital in firm dynamics, the main objective of this research is to highlight the main gaps and insights in the working capital literature and suggest future research, as well as to know the development trend of working capital management research published by leading journals. For this reason, a bibliometric analysis was carried out using bibliographic information from Scopus for the topic "working capital management." The method used in this quantitative research uses Bibliometric analysis. A quantitative analytic approach was used to analyze published studies from 1992 to 2022. The mapping software used was VOS Viewer and biblioshiny R to analyze the data obtained and visualize research trend data. The results of the analysis show that the development of articles with the theme of Working Capital Management continues to increase from year to year, although not constant and essential. The most published authors of articles on Working Capital Management are Karri, T. and Michalski, G. The United Kingdom is the country most cited. 2019 was the year with the highest number of publications on Working Capital Management. The International Journal of Recent Technology and Engineering is the highest source that occurs in 2019. Business, Management and Accounting are the most mentioned trending topics with a total of 38%. ***Keywords***: *Working Capital Management, Bibliometric, Biblioshiny, VOS Viewer, Scopus.*

1. Introduction

The topic of working capital management has an essential significance in the corporate finance literature. Working capital can significantly affect a company's performance and profitability, according to earlier studies. This suggests that effective working capital management is crucial to ensuring that the business has enough cash flow to cover its short-term debt and expenses in

addition to other current liabilities. Working capital should not be too high or excessively low, but at a level that is appropriate for the company's operational success, hence the word "sufficient" has special significance in this context. Working capital can significantly affect a company's performance and profitability, according to earlier studies. This suggests that effective working capital management is crucial to ensuring that the business has enough cash flow to cover its short-term debt and expenses in addition to other current liabilities. Working capital should not be too high or excessively low, but at a level that is appropriate for the company's operational success, hence the word "sufficient" has special significance in this context. The idea of working capital has a number of aspects that are connected to the worth of the business and its financial performance. Typically viewed from a financial perspective in the literature, but occasionally connected to other meanings, such as productive capital stock [1] or operational costs. However, there is much room for exploration in the working capital related subject.

According to Pritchard, who first used the term in 1969, bibliometrics is "the application of mathematical and statistical approaches to books and other forms of communication" [2]. Text analysis, citation analysis, content analysis, keyword co-occurrence, co-citation analysis, or co-authoring analysis are all part of bibliometric approaches [3]. Bibliometric analysis is quite similar to info metric, or scientometric in more specific terms. Webometrics, which analyzes numerous aspects of the web, is another well-known comparison [4].

Initially, bibliometric analysis, also known as scientometrics or even analysis, focused mostly on the scientific features of output as measured by the quantity of publications generated and articles with high citation counts [5]. Citation analysis, also known as evaluating the impact of publications, is a conventional bibliometric technique that is frequently used to analyze scientific quality indicators for individual researchers, ranking institutions or universities, or even a country [4]. However, as bibliometrics matures, it is being utilized more and more to convey data on the connections between diverse authors, groups, study areas, institutions, and others. Usually, bits of study material or published articles will contain this information [6]. This is important information for researchers to know in order to collaborate with others and stay informed of emerging research trends. The practical ramifications have led to an increase in employee demands for productivity or performance reports from various institutions, including government organizations. Therefore, bibliometric investigations are useful in all situations.

More study is still needed to link working capital management to a factor that motivates the author to talk about the growth of working capital management applications. This study was done to determine how working capital management studies evolved between 1992 and 2022.

Considering the context above, the main aim of this research is to highlight the main insights generated from the scientific literature on the "working capital" dimension and point out gaps and suggestions for future research lines. In particular, in this research, the aim is to answer the following questions related to the topic of "working capital": (1) what is the trend of working capital management research based on the number of publications per year?; (2) which journal has published the most papers on working capital management (3) What is the level of network and centrality in co-authorships?; (4) What are the fields of study or disciplines that contribute to research?; (5) What are the leading potential topic suggestions for future research on the Biblioshiny R literature; (6) which country's authors contributed the most? ; (7) which articles are most influential based on citation size in the VOS Viewer literature? Based on this description, a bibliometric analysis research was carried out with the title trend analysis of working capital management research.

2. Literature Review

Working capital is a component of current assets, which also include cash and cash equivalents, receivables, inventory, and other current assets, according to Harmony. Meanwhile, according to Djarwanto (2010) working capital is the excess of current assets over short-term debt. This excess is referred to as net working capital; this excess is the amount of current assets that come from long-term debt and own capital [7]. Working capital management is an activity that covers the entire management function regarding the current assets and current liabilities of a company. Working capital management can be one of the aspects that must be considered in the company [7]. It's likely that the business will be insolvent if it is unable to control and maintain the amount of working capital [8]. A company's long-term objectives can easily be impacted by working

capital, thus managing it is a continuous effort to increase operational effectiveness. To increase operational efficiency, businesses must also make sure that resources are not wasted and that overtrading can be prevented.

One of the most reliable measures of a company's financial health is working capital management. This suggests that effectively managing working capital is directly tied to a financially stable business [9]. This further shows that having the business acumen is essential for the company's growth and for leveraging its assets. According to Gitosudarmo (2008, 33), by learning about the concept of working capital, the notion of working capital can be grasped (a). The idea of quantitative working capital is a collection of funds in the form of cash, receivables, inventories, and pre-paid expenses that are embedded in current assets. The turnover of funds contained in current assets will occur quickly. Therefore, the number of current assets equals the amount of working capital. (b) The short-term debt that must be paid in full right away is related to the qualitative idea of working capital. Working capital is a collection of resources included in current assets that can be utilized to finance business operations or remain after current debt has been paid off [10]. In other words, the amount of working capital is the excess of current assets over current liabilities. (c) The functional concept of working capital is based on the function of the fund to generate income. The income in question is current income, not income from earlier accounting periods (future income). According to this idea, a variety of funds are classified as nonworking capital if they do not produce current income or if they do not align with the company's objective [11].

Bibliometrics when used in academic research, it can be defined as a set of methods for providing quantitative analysis of written publications [12]. The most commonly used metrics in bibliometric analysis consist of publication number, a number of citations, average citations per article, h-index, and co-authorship [3]. Despite its merits, analysis of bibliometric data must be undertaken with caution. Much of the criticism of bibliometrics is based on the fact that impact, as calculated by the citation indicator, is not necessarily indicative of quality. In addition, different fields tend to have very different publication and citation patterns. So direct evaluation of publication and citation metrics for different subjects should be applied with caution [13]. Compared to previous studies, according to Scopus, the subject of this study is "working capital". Finally examining the literature on working capital management policies, a bibliometric analysis, and According to this viewpoint, the primary contribution of this study to the literature is concentrated on the various "working capital" characteristics that have been represented in the literature, with special emphasis on the key features of working capital management policies.

The relationship between working capital and sustainability as well as the effects of working capital management on particular economic sectors and activities should be emphasized as a crucial insight that will be addressed in these problems. On the other side, there is room for expanding networking on the subject of working capital management across writers, organizations, and nations. Materials and methods, bibliometric analysis, research strategies on working capital management policies, discussion, and conclusions make up the remaining portion of this paper. The relationship between working capital and the sustainability and influence of working capital management on particular economic sectors and activities is the topic of this research, which will be studied in these themes [14].

3. Research Method

This research is adescriptive bibliometric research based on literature database. Bibliometric mapping is a research topic in the field of bibliometrics. The huge volume of scholarly literature produced each year by scholars from different nations throughout the world is a fascinating source for crucial ideas, and bibliometric analysis is an intriguing method for highlighting these insights. According to a Scopus search, interest in bibliometric approaches among scholars has grown recently.

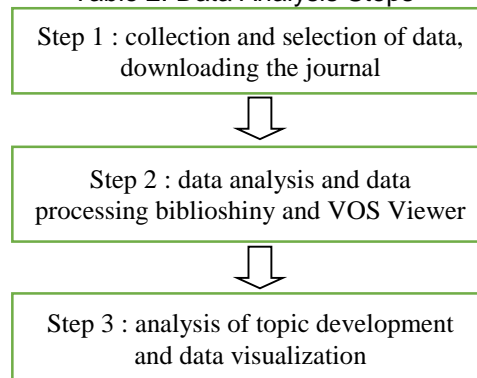Table 1. The term working capital management first appeared

Writer	Tittle	Source	Year
Belongia MT	The effects of management decisions on agricultural banks and failures	American journal of agricultural economics	1990

In essence, bibliometric analysis identifies a body of literature, typically linked to a set of published data on a certain subject of study. When analyzing a data set, statistical methods might be helpful. The creation of bibliometric maps and the graphical display of maps are two bibliometrics facets that can be differentiated [15]. In the bibliometric literature, the greatest concern is with the construction of bibliometric maps [16]. Research related to the effect of differences on similarity measures and tested with different mapping techniques [17]. There hasn't been much discussion on bibliometrics' graphical representation. Despite the fact that some scholars take the study of issues with graphical representations seriously. The majority of bibliometric literature articles rely on straightforward graphical output from computer systems. This study makes use of data that has already been published in articles taken from a variety of scholarly publications and other sources with a working capital management focus. Working capital management research trends are visualized using biblioshiny software and the VOS Viewer as analytical tools.

The following are the steps in data processing: Choosing the appropriate keywords is the first step. In order to include all components of working capital management, this study creates a keyword network using different terms. The search for articles in the Scopus database comes next after the keywords are finalized. Journal articles and conferences with Indonesian authors were the only sources that were searched. The next step was to refine the initial results by excluding duplicate documents, leading to the identification of documents that were relevant within the last 30 years.

Finally, the data analysis process was carried out using bibliometric software (biblioshiny R) as well as VOS Viewer to visualize working capital management research trends.

Table 2. Data Analysis Steps

Step 1 : collection and selection of data, downloading the journal

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Step 2 : data analysis and data processing biblioshiny and VOS Viewer

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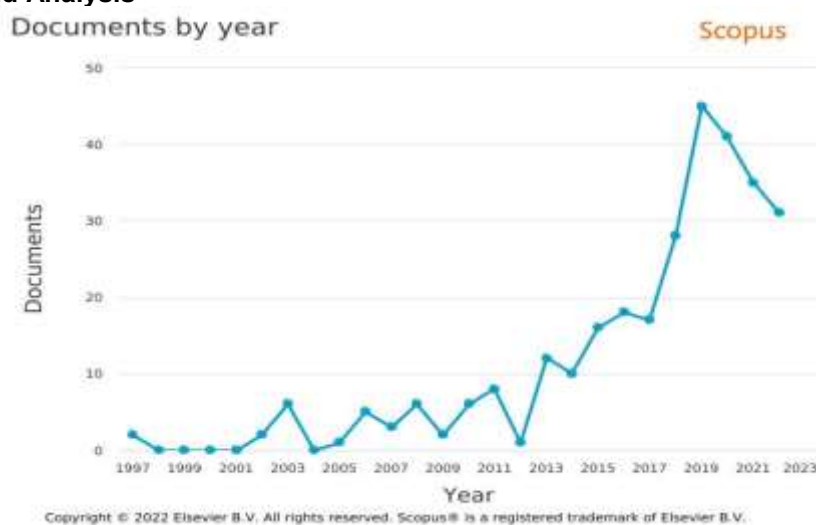| Step 3 : analysis of topic development and data visualization |
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4. Results and Analysis

Figure 1. Research trends in working capital management policies around the world

Working capital management research trends based on the number of publications per year (RQ1)

Figure 1 shows research trends on Working Capital Management based on the number of articles published per year. In general, research on working capital management in the world began to develop for the first time since 1997 with 1 publication and at this time research trends are still advancing in terms of the number of publications. In general, research on Working Capital Management began to develop for the first time since 2013. In understanding research trends, data analysis at the highest peak was in 2019. And for the following year, the number of research publications will remain a trend and is still ongoing.
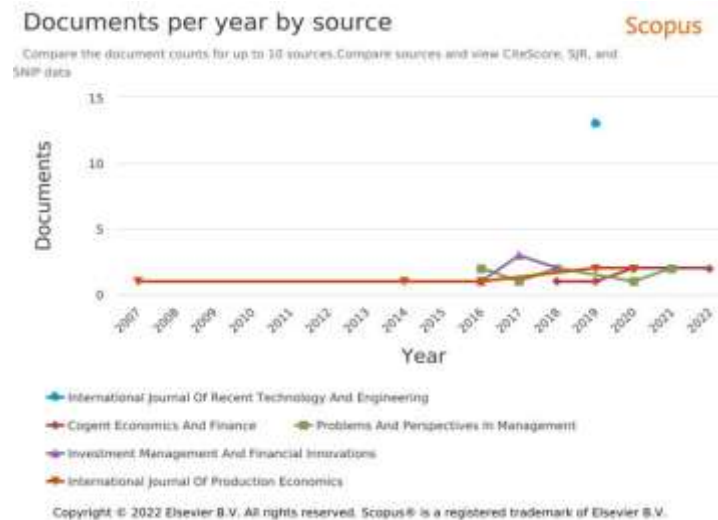

Figure 2. Shows the top ten peer reviewed journals with the most publications in working capital management research

The journal that has the most published articles in the field of working capital management research (RQ2)

Figure 2 shows documents by source showing documents per year by source from 2007 to 2022, which shows the top 5 sources in working capital management research. If we look at trends from time to time, it can be seen that the first documents per year based on sources come from the International Journal of Recent Technology and Engineering, namely 14 documents in 2019. Next, secondly from Cogent Economics and Finance as many as 3 documents from 2018 to 2022, and Problems and Perspectives in Management in 2 documents from 2016 to 2021. The third is from Investment Management and Finance Innovations, namely 4 documents in 2017. And the fourth or last from the International Journal of Production Economics as many as 3 documents in 2020.
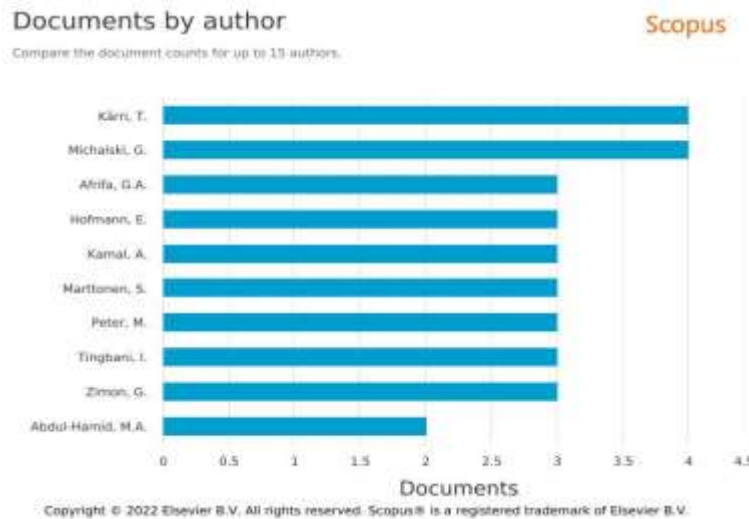
Figure 3. The top ten contributing authors in working capital management research worldwide

Most prolific author in working capital management research publication (RQ3)

Figure 3 shows there are ten authors who contributed to working capital management research. First, Karri, T. and Michalski, G. are the authors with the highest number of publications, namely 4 documents. Second, Afrifa, GA, Hofmann, E., Kamal, A., Marttonen, S., Peter, M., Tingbani, I., and Zimon, G. are authors with 3 publications each. And the third is Abdul-Hamid, MA with a total of 2 publications.
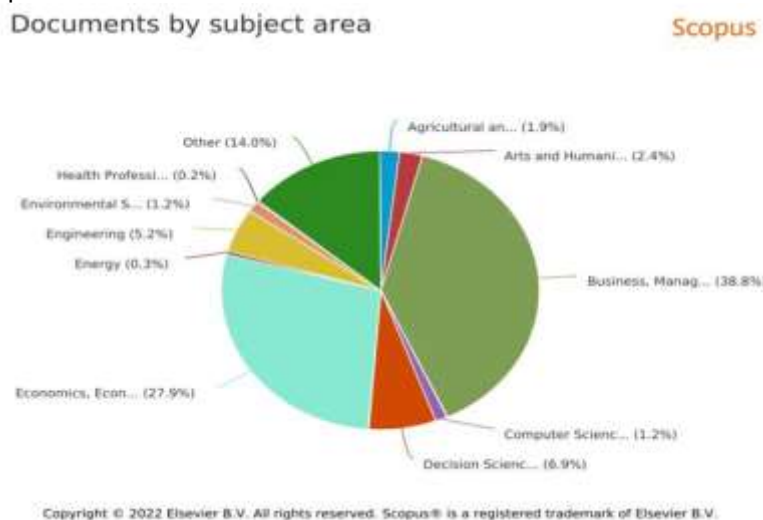

Figure 4. Several fields of study of working capital management policies based on publications

Subject areas or disciplines that contribute to research (RQ4)

Figure 4 shows that the subject area related to working capital management is Business, Management and Accounting with 38.8% ranked first. The second rank is Economics, Econometrics and Finance with 27.9%. Then followed by the subject of Decision Science as much as 6.9%. Furthermore, there are Engineering subjects as much as 5.2%. Subjects below 5% were Arts and Humanities (2.4%), Computer Science (1.2%), Environmental Science (1.2%), Energy (0.3%), and Health Professionals (0.2%). In addition there are other subjects as much as 14.0%.

Data analysis

Bibliometric data that has been stored in RIS format will be visualized using VOS Viewer software. According to Hudha [18] VOS Viewer can be applied to analyze and create graphical

representations in the form of bibliometric maps. VOS Viewer is widely used because of its ability to work with large data sets, displaying sizable bibliometric maps in an easy to understand and interpret way. Based on studies [5] VOS Viewer can handle large maps and display co-citation maps of major scientific journals. VOS Viewer can also create publication maps, country maps, author maps, or journal maps based on co-citation networks or build keyword maps as topic modeling. Moreover, as a free tool VOS Viewer is currently being used to complete research related to data mining.

Topic Area Visualization Using VOS Viewer

In this section, a bibliometric analysis is carried out using the VOS Viewer to visualize results based on frequently appearing keywords. This is very useful because it can show us topics that have been researched for 30 years (1992-2022). VOS Viewer also provides cluster analysis which shows the relationship between one topic and another [18], particularly in the field of working capital management research. This research has mapped the bibliometric analysis in three different visualizations, namely (1) data network visualization as shown in Figure 5; (2) overlay visualization in Figure 6; and (3) density visualization in Figure 7.
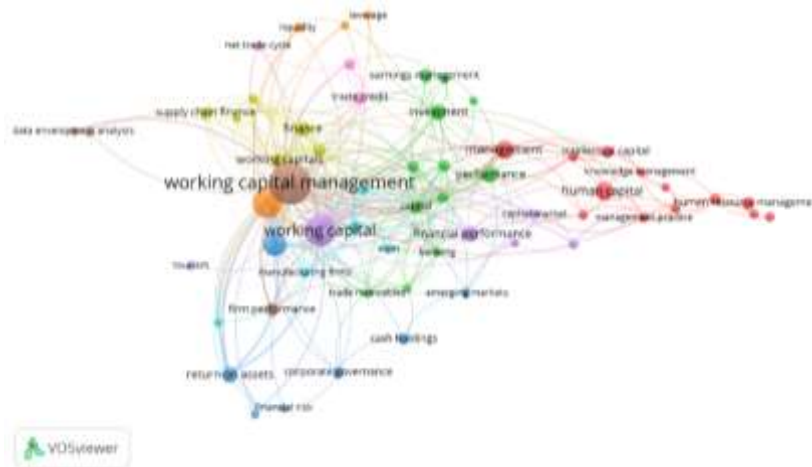

Figure 5. Scopus Database Network Visualization using VOS Viewer

Main topics and research streams in the Working Capital Management research field (RQ5)

In Figure 5, the visualization of items (keywords) related to the working capital management research topic is labeled and symbolized as a circle by default in VOS Viewer. Items or keywords are increasingly important because the more often they appear, the bigger the circle. To study research hotspots from existing research, we undertook keyword co-appearance from the publication Working Capital Management. The frequency of occurrence determines the size. The keywords Working Capital Management and Working Capital are the top research topics because of the highest frequency of occurrence. When a color is assigned to an item, each circle has a different color according to the cluster.
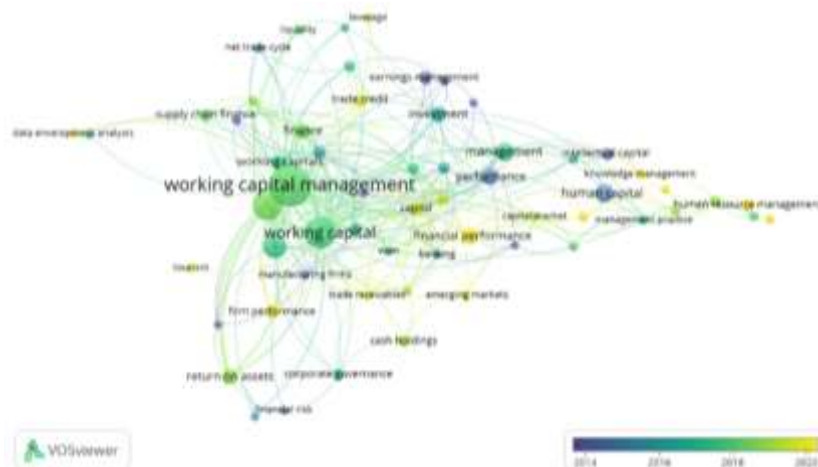
Figure 6. Scopus Database Visualization Overlay using VOS Viewer

Main research topics in the field of Working Capital Management (RQ6)

In Figure 6 above is a visualization of the Scopus database network which explains that there are 9 top clusters as trending research topics and their interrelationships in the Working Capital Management topic area. The color in the image represents the year each article was published where if the color is getting yellower then the research will only be conducted around 2020, but if the color is getting bluer (2014), then the research is a research that has been done for a long time. Each cluster on the map consists of many terms that are related to one another. The emergence of keywords that correspond to the subject of previous research with high frequency appears for each cluster. For example, in Cluster 1 there are 13 items and the main keyword is Management (22). Cluster 2 with 12 items has Commerce (21), Cluster 3 with 7 items has a Cash Conversion Cycle (53), Cluster 4 with 6 items has Working Capitals (35), and Cluster 5 with 5 items has Working Capital (66). Then, cluster 6 with 5 items has Cash Flow (19); cluster 7 with four things, has Profitability (79); cluster 8, with four items, has Working Capital Management (133); and cluster 9 with three items, has Firm Value (14).

Each Cluster takes the main topic as the direction of Working Capital Management research based on keywords in the Cluster where these keywords represent the research flow. To make this research more accessible, we limit only the top three keywords with the highest frequency of occurrence: Working Capital Management, Profitability (79), and Working Capital (66). Judging from the results of the analysis above, Working Capital Management is a significant research issue and a sub-field in Working Capital Management research.

Table 3. Clusters Analysis Results

No	Clusters	Most frequent keywords	Keywords
1	First cluster – 13 items	Management (22), Management Practice (13), Working Conditions (12), and Competitive Advantage (10).	Competitive Advantage (10), Covid-19 (4), Human Capital (10), Human Resource Management (2), Innovation (9), Intellectual Capital (3), Knowledge Management (7), Management (22), Management Practice (13), Organizational Commitment (7), Psychological Capital (3), Social Capital (8), Working Conditions (12).

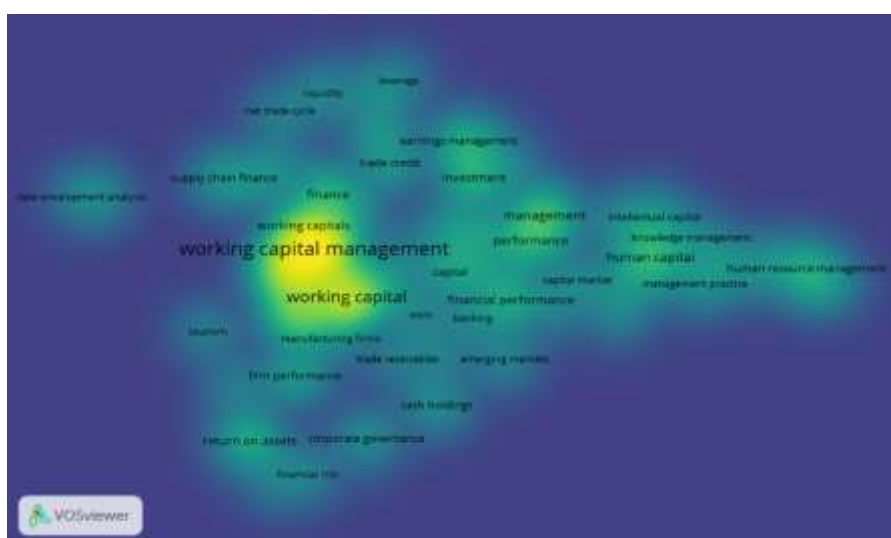| 2.	Second cluster – 12 items	Commerce (21), Efficiency (20), Investment (20), Performance (20), Capital (18), and Competition (17).	Banking (12), Capital (18), Commerce (21), Competition (17), Earnings Management (4), Economics (10), Efficiency (20), Employment (4), Inventory (12), Investment (20), Performance (20), Trade Receivables (13).
3.	Third cluster – 7 items	Cash Conversion Cycle (53) and Return on Assets (27).	Cash Conversion Cycle (53), Cash Holding (4), Corporate Governance (7), Emerging Markets (6), Financial Risk (5), Return on Assets (27), Return on Equity (7).
4.	Fourth cluster – 6 items	Working Capitals (35), Finance (33), and Supply Chain Management (19).	Finance (33), Financial Constraints (13), Inventory Control (12), Supply Chain Finance (10), Supply Chain Management (19), and Working Capitals (35).
5.	Fifth cluster – 6 items	Working Capital (66), Financial Performance (20), and Capital Market (14).	Business Development (9), Capital Market (14), Financial Market (7), Financial Performance (20), Tourism (1), and Working Capital (66).
6.	Sixth cluster – 5 items	Cash Flow (19), and Manufacturing Firms (15).	Account Receivable (5), Cash Flow (19), Industry (11), Manufacturing Firms (15), WCM (11).
7.	Seventh cluster – 4 items	Profitability (79).	Leverage (3), Liquidity (6), Panel Data (6), Profitability (79).
8.	Eighth cluster – 4 items	Working Capital Management (133).	Data Envelopment Analysis (4), Firm Performance (12), Optimization (3), and Working Capital Management (133).
9.	Ninth cluster – 3 items	Firm Value (14), and Trade Credit (12)	Firm Value (14), Net Trade Cycle (9), Trade Credit (12).

Figure 7. Scopus Database Density Visualization using VOS Viewer

Potential topics in e-government research areas for future study (RQ7)

Figure 7 above represents potential topics in the field of working capital management research which require more investigation in the future. Thus, in Figure 7 it provides an opportunity for researchers to identify potential topics as new contributions from work in the working capital

management research field. In terms of related research topics, we can see that, for example the keyword "Working Capital" has never been studied with "Financial Risk" at the same time since they are in different clusters. This topic is a relatively new trend for researchers to conduct research based on combination terms.
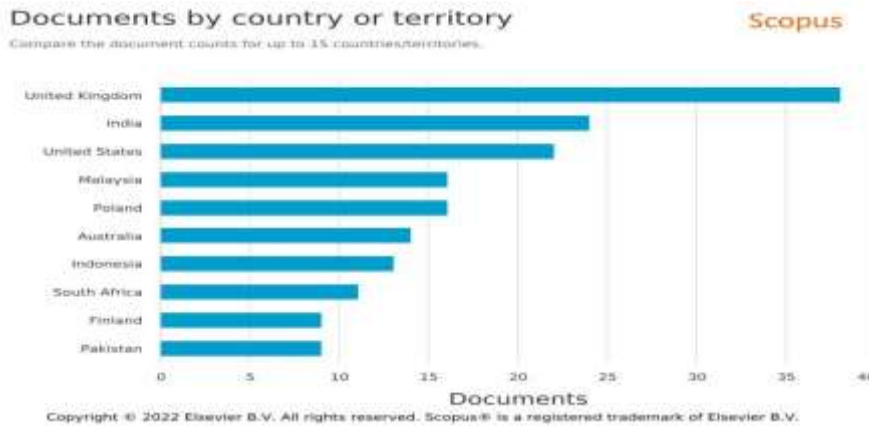

Figure 8. Top Ten Author Countries by Publication Number

Country of Authors and Visualization Collaboration Using VOS Viewer
        In this section, a bibliometric analysis is performed to analyze and visualize the countries of authors that contribute to the research field of Working Capital Management. The minimum number of documents a country is set by default is one document. The 10 authors above show that they have the highest number of publications.

Country of authors contributing the most publications to Working Capital Management research and their collaborations (RQ8)
        Figure 8 shows that the country with the most research publications on the topic of working capital management is the United Kingdom, with 38 documents, followed by India, with 24 documents. The United States published 22 papers, followed by Malaysia and Poland with 16 documents. Furthermore, Australia with 14 documents, Indonesia with 13 documents, and South Africa with 11 documents. The last two countries, namely Finland and Pakistan, have less than 10 documents.
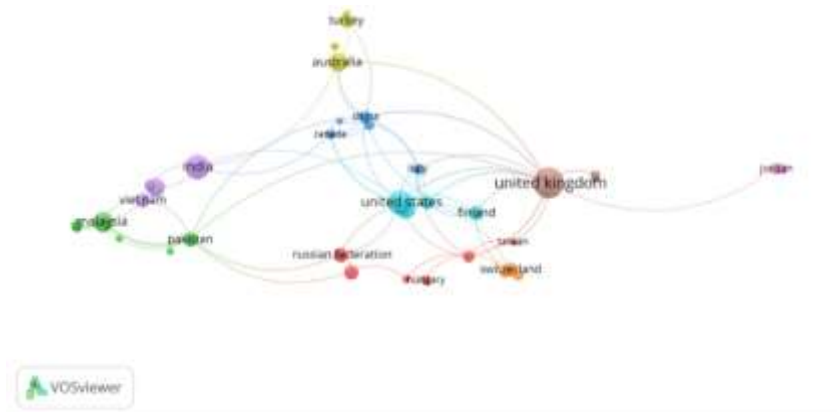

Figure 9. State Collaboration of Author Visualization

        Figure 9 shows the collaboration of the author's countries in working capital management research. The circles above are interconnected from one country to another, it shows cooperation between countries. The larger the circle size indicates the larger the country publication number. We can see that the United Kingdom has the most prominent circle among other countries, meaning that the country dominates this research study. They are a central point for working capital

management studies where other countries conducting working capital management studies have links with the United Kingdom. Country/region collaboration networks can be obtained with VOS Viewer, as shown.

In Figure 9, where are the most extensive connection items in 17 countries/regions. To describe better results. The node size in this image represents the country/region publication number. Countries/regions that are connected through the link indicate that there is a cooperative relationship between them. Different colors codes represent different clusters. All parameters and collaboration networks below have the same meaning.

Which articles are most influential based on citation size in the VOSVIEWRS literature (RQ8)

Table 4. Most Cited Articles

No.	Tittle	Year	Source	Citation
1.	Determinants Of Wce; Inventory; Stochastic Frontier Analysis; Trade Payables; Trade Receivables; Working Capital Efficiency; Working Capital Man	2022	Technological Forecasting And Social Change	184
2.	Working Capital Management Of Smes In Covid-19: Role Of Managerial Personality Traits And Overconfidence Behavior	2022	Economic Analysis And Policy	79
3.	Feeling Like A Million Miles Away From Home? Well-Being At Work Of Expatriates In The Resources Sector In Indonesia	2022	Journal Of Human Resource Management	36

Our study shows that scopus journals have a huge impact on metrics related to citations. Table 4 shows the most cited articles in the field of e-government research, and we limit the results to only the top three articles that have the highest citations among the rest. The total number of citations is used to determine the most influential articles as shown in Table 3. The article entitled Spillover and risk transmission between the term structure of the us interest rates and islamic equites has been cited 73 times representing the highest cited article overall in this field. The article entitled On the regulation of the intersection between religions has been cited 59 times representing the third highest cited article overall in this field. The article entitled Classical islamic perspective on WCM theory has been cited 35 times representing the second highest cited article overall in this field.

Framework and Findings

Figure 10. Working Capital Cycle

Table 5. Working Capital Cycle

Source	Items	Author and Published Year
Working Capital Cycle	Cash	[19]
	Raw Material Inventory	[20]
	Finished Goods	[21]
	Account Receivables	[22]
	Purchases	[23]
	Production	[24]
	Customer Invoiced	[25]
	Collection	[26]

Figure 10 above is a working capital cycle that shows the length of time it takes for business companies to convert their aggregate net working capital into cash. It also demonstrates the proficiency and ability of the organization to manage its liquidity in the short term.

Working capital formula = Inventory days + Receivables days – Payable days

In short, the shorter this cycle, the better the company's position to free up cash stuck in its working capital. It is very important to maintain shorter cycles. Otherwise, the capital will be locked in the operational cycle without generating any returns. An effective way to shorten this life cycle is to increase the ability of a business venture and increase its liquidity in the short term. Typically, businesses maintain this by selling inventory, generating revenue through sales, and gradually paying off existing debts.

5. Conclusion

Based on the research that has been done to find out the development of research on Working Capital Management during the period 1997 to 2022. Meanwhile, the keywords used in this study are the words working capital management, profitability, and working capital. From the data processing, several results were obtained, namely the first showed research trends on Working Capital Management based on the number of articles published per year. In general, research on Working Capital Management in the world began to develop for the first time since 1997 with a total of 295 published articles and continues to grow until this year. The second research result is a journal that shows the top ten per review with the most publications in Working Capital Management research and contributes around many articles, namely the International Journal of Recent Technology and Engineering with 14 documents in 2019. The third research result is about ten authors who top contributors with articles published in peer-reviewed journals, Karri, T. and Michalski, G. has been the most prolific author on the list who has written 4 articles. The results of the fourth study are based on the classification of journals based on the subject area, namely Business, Management and Accounting as much as 38.8%. The results of the fifth, sixth and seventh studies show that based on the linkage of keywords, we can find that the keywords Working Capital Management and Working Capital are the top research topics and unrelated to other keywords. In addition, the main research topic in the field of working capital management, the main keyword is Management. For example, the keywords "working capital management" and "financial risk". This means that the two keywords have never been studied together and provide opportunities for new research trends to emerge. The results of the eighth study showed that the United Kingdom was the country that contributed the most to working capital management research with more than 35 articles published. The results of the ninth or final research were obtained by the

collaboration of the countries with the most authors in Working Capital Management based on the author's visualization, namely the United Kingdom.

So from the results of the 295 documents used in this study, it shows that research with the theme of Working Capital Management has increased every year above, it can be concluded that Working Capital Management has begun to develop drastically from year to year, but there is still a need for more research to help corroborate the results obtained. Existing results can be used by both the general public and companies to add to the literature on Working Capital Management. The aim of this study was to fill a gap as no bibliometric analysis of the working capital management literature had been conducted in the previous ten years. Due to the substantial progress, the aim of this research is to update and enrich the bibliometric analysis. The implication of this research is that there are two most influential authors and five most influential document sources, then Working Capital Management is the most searched topic. Thus the implications of this research can be referred to as Working Capital Management research.

Contribution

The contribution of this study is to fill the gap as no bibliometric analysis has been carried out with the Working Capital Management literature in the last decade. Thus this research is also intended to update and enrich the bibliometric analysis. Another contribution of this research is due to the limited use of VOS Viewer in the bibliometric analysis of Working Capital Management.

Research limitations

Bibliometric research on the theme of Kali, namely working capital management, cannot be separated from limitations. Keyword searches only use general keywords, so some relevant articles may be missed. Thus, further research can broaden the types of units analyzed, include more detailed keywords, and broaden the scope of the database to include others, such as Web of Science (WoS), Springer, IEEE Xplore, and others. To eliminate the author's bias, the results of bibliometric studies should also be compared with other approaches such as Hits cite and Bib Excel. In addition to the limitations of using VOS Viewer's bibliometric analysis of the working capital management literature, the use of VOS Viewer to map and visualize bibliometric data has been successfully demonstrated. The fact that this study only uses data from the Scopus database is a weakness.

Conflicts of Interest: The authors declare no conflict of interest.

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