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A bibliometric analysis of the world of VUCA in business and management literature

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Abstract

The aim of this study is to make a bibliometric analysis of scientific studies on "VUCA" in the fields of business and management for the period of 2013-2023. In this context, data was obtained from the Web of Science (WoS) database and the VOSviewer programme is applied to analyze. The results showed that it was determined that there were 393 studies on the concept of VUCA, and it was found that 154 of these studies were in the business and management category. The findings of the analysis indicate that the highest number of studies on VUCA were conducted in the management category and the most studied document type was the article. According to the results of the analysis, which revealed that the interest in the subject had been increasing, especially after 2016, the most cited author was “Bennett and Lemoine (2014)”; the most productive country was the USA and the most used keyword besides “VUCA” was "leadership". It is belived that the findings obtained from this study will insight into the studies to be carried out on the subject and contribute to the researchers about the research areas that are growing in the field of VUCA and the topics that will be the focus of research activities in the near future.

Keywords: VUCA, Bibliometric Analysis, Vosviewer

JEL Codes: M10, M12

1. Introduction

Today's world has acquired an entirely different dimension due to numerous major reasons such as globalization, digitalization, political and economic instability, climate change, wars, and refugee crises. An environment dominated by fear, uncertainty, pessimism and panic has emerged, especially with the Covid-19 pandemic process. The prolongation of the process, its long-term effects and uncertainties have made planning and forecasting for the future more difficult and resulted in volatility, uncertainty, complexity and ambiguity. This condition, represented by the acronym VUCA (Volatility, Uncertainty, Complexity and Ambiguity) has affected every aspect of life.

Although VUCA initially emerged as an abbreviation of military origin, it is now used by more and more people to describe the chaotic environment of businesses (Bennett & Lemoine, 2014a: 312). Because considering the global economic conditions, volatile financial markets, technological disruptions, a wide variety of competitors, ever-changing customer demands and employee needs, each factor has its own complexity and uncertainty. When such phenomena occur simultaneously, their effects are complex and profound (Turner & Margolis, 2012). For many years, many of the events in question have been happening simultaneously, and creating a chaotic structure. Therefore, VUCA is making its impact felt more intensely in business life as it is in all areas of life, and it is among the issues that are emphasized and have become the center of attention in the scientific world.

It would be possible to reveal the specific situation of such a comprehensive field with a bibliometric study. The aim of this study is to provide detailed information about the matter at hand and create a roadmap for researchers who want to work on this subject by making a bibliometric analysis of the studies on VUCA in the fields of management and business. In this context, first, the conceptual framework for the concept of VUCA was presented in the study, and then a bibliometric analysis was conducted of the studies published relevant field subject in the WoS. The results obtained from this study are important in so far as they will allow resarchers to observe the developmental course of the subject in question.

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2. Conceptual Framework

The VUCA was first created in 1987 by utilizing the leadership theory of Warren Bennis and Burt Nanus (Sinha and Sinha, 2020: 17). The concept, which was introduced by the US military in the early 1990s, was used to describe chaotic and dangerous environments where it is difficult to predict the next moves of the parties as a result of the emergence of many threats after the end of the Cold War (Yar, 2019: 35).

Although VUCA was widely used in military circles initially, it began to be used in a wide variety of situations, from non-profit organizations to the field of education, from financial markets to political formations and environments (Wolf, 2007). This acronym became more widespread especially in the business world, after the global financial crisis in 2008 and 2009 (Tovar, 2016) and it is now also becoming a standard business term that cannot be ignored (Sullivan, 2013). In addition, the increasing interdependence of large companies and their influence in shaping the global economy has significantly increased the impact of VUCA in the business world (Jamil & Humphries-Kil, 2017: 68).

VUCA refers to the sum of the efforts of strategy, production, taking action, getting results and managing people in an environment where uncertainty and complexity prevails from politics to economy and from state administration to business administration (Yar, 2019: 35). The differences between the four sub-dimensions of the VUCA concept, namely variability, uncertainty, complexity and ambiguity, are presented in Figure 1:

Source: Bennett & Lemoine (2014b)

Figure 1. Differences Between VUCA Dimensions

(i) Volatility: this refers to relatively unstable and sometimes unpredictable changes (Bennett & Lemoine, 2014a: 313). Price fluctuations, changes in lifestyles, renewable energy, changes in policies and customer preferences, and commodity prices are some examples of this construct (Bir & Koç, 2022: 1272). In short, volatility is not only about changes in the business environment, but also in the economic and social environment, each of which has an impact on business (Sinha & Sinha, 2020: 17-18).

(ii) Uncertainty: characterised by low predictability, the likelihood of surprises, and a lack of specific information (Schick et al., 2017: 7). Uncertain environments are places where large 'dramatic' changes occur frequently (Sullivan, 2012). One of the best examples of this component is the 2001 terrorist attacks in the US. After these events, there was much more uncertainty in the world about where, when and if another attack would occur (Bennett & Lemoine, 2014: 314). Uncertainty is therefore associated

with a lack of control and uncertainty about what will happen in the near future (Nowacka & Rzemieniak, 2022: 3).

(iii) Complexity: it refers to the intricate and extensive network structure and dynamic pathways that exist between the components of a system (Schick et al., 2017: 8). In other words, complexity is characterised by many interconnected parts and variables (Ko & Rea, 2016: 378). A change in one of these components or variables affects the entire environment in question (Akdemir et al., 2021: 350). Some information about the nature of complexity is available or can be predicted. For example, the laws, regulations and cultural expectations that a firm encounters when operating in another country are complex, but there is no unpredictable variability there (Raghuramapatruni and Kosuri, 2017: 17).

(iv) Ambiguity: it refers to the lack of clarity in information about the actual situation and conditions (Chakraborty, 2019: 2). Ambiguous environments are places where the 'who, what, where, when, how and why' behind causes and events are unclear and difficult to discern (Sullivan, 2012). Ambiguity creates mistrust, slows down decision making, creates threats and leads to missed opportunities (Cooke, 2013). Technological disruption, global competition, demographic changes and new work values are key drivers of increased ambiguity (Bader et al., 2019: 132).

Each of the VUCA components is not always disruptive and disruptive on its own. However, sharp increases that can occur simultaneously in the four VUCA components can turn this situation into a threat (Prensky, 2014). The "VUCA PRIME" approach was proposed by Bob Johansen in 2007 to protect against the threats of the VUCA world and to seize its opportunities. Within this approach, the strategies of vision versus voyality, understanding versus uncertainty, clarity versus complexity and agility versus ambiguity were proposed (Lawrence, 2013: 6).

3. Method

In this study, studies conducted on the concept of "VUCA" in the fields of management and business were examined through bibliometric analysis and the data obtained were presented with the visual mapping technique.

Bibliometric analysis contributes to the literature due to its benefits such as identifying the most influential scientific publications and sources, evaluating current changes and developments in science, and assessing the results by forming an academic basis (Martinez et al., 2015: 257). In addition to providing objective criteria, it is also used for evaluation of scientific quality and efficiency (Ekşi et al., 2022: 138). In this context, bibliometric analyses are methods that quantitatively reveal the relevant institution, country, institute, journal, publishing house, university, author and the citation and the relationship networks between them by providing researchers with a scientific roadmap regarding the subjects they explore (Kurutkan & Orhan, 2018: 10-11). Therefore, bibliometric analysis has been preferred in this study because it has an infrastructure that can help comprehensive reviews and minimize researcher errors (Donthu et al., 2021: 285).

Today, bibliometric analyses can be performed via traditional methods or using various databases. Databases such as WoS, Scopus, Google Scholar, PubMed and MEDLINE are among the most preferred databases for bibliometric analysis (Chen, 2017: 3; Cobo et al., 2015: 43). In this study, the WoS database was preferred. Because WoS is a pioneer among scientific literature databases in the field of social sciences and includes the minutes of international conferences, symposia, seminars, workshops and congresses (Martinez et al., 2015: 257). In addition, this database has high impact quality indicators and provides basic metadata such as abstracts, references, number of citations, author lists, institutions, countries and journal impact factors (Brito-Ochoa et al., 2020: 71).

Within the scope of the research, data were obtained from the WoS database on 14 July 2023 using the keyword "VUCA". In the first stage, 393 publications were by selecting "topic" with the relevant word in the WoS database. Inclusion and exclusion criteria were then applied to these publications. The WoS research category was limited to "business and management" and the document types to "article, proceeding paper and book chapters". As a result of the exclusion and inclusion criteria, 154 studies on

the concept of VUCA in the fields of management and business were determined as data sets. In addition, although all the years in the database were selected as the time interval, only studies between 2013 and 2023 (Since studies on VUCA in the business and management literature began to be conducted for the first time in 2013, this period was taken into account) were included in the study due to the inclusion and exclusion criteria. In the second stage of the research, the VOSviewer (version 1.6.17) software program was used to visualize the obtained data. VOSviewer is a program for creating, visualizing and exploring maps based on all kinds of network data (Van Eck & Waltman, 2021: 3). Unlike other mapping programs (Bibexcel, CiteSpace, CopalRed, IN-SPIRE, CRExplorer, Network Workbench Tool, Science of Science Tool, VantagePoint, SciMAt etc.), VOSviewer has been preferred in this study because it gives importance to graphic presentation.

4. Findings

Within the scope of the research findings, first the results of the performance analysis and then the scientific maps were presented. In this context, it was found that 57 % of the publications accessed had been made in the field of management and the remaining 43 % had been made in the field of business, and the distribution of the said publications by document type is shown in Table 1. When Table 1 is examined, it is seen that the most common type of publication on VUCA is article, whereas the least common type is book chapters.

Table 1. Publications by Document Type

Document Types	Record Count
Article	111
Proceeding Paper	27
Book Chapters	16

The distribution of the publications and citations by years is shown in Figure 1. When the "number of articles by years" in the figure is examined, it is seen that the studies on VUCA started in 2013, the interest began to increase in 2017 and the publications reached the highest level by 2022. In the current (year 2023, July), however, the number of publications throughout the year could not be determined due to the fact that we are still in the middle of the year. However, it is seen that 18 publications have already been reached. In addition, there is also a general trend of increase in the number of citations

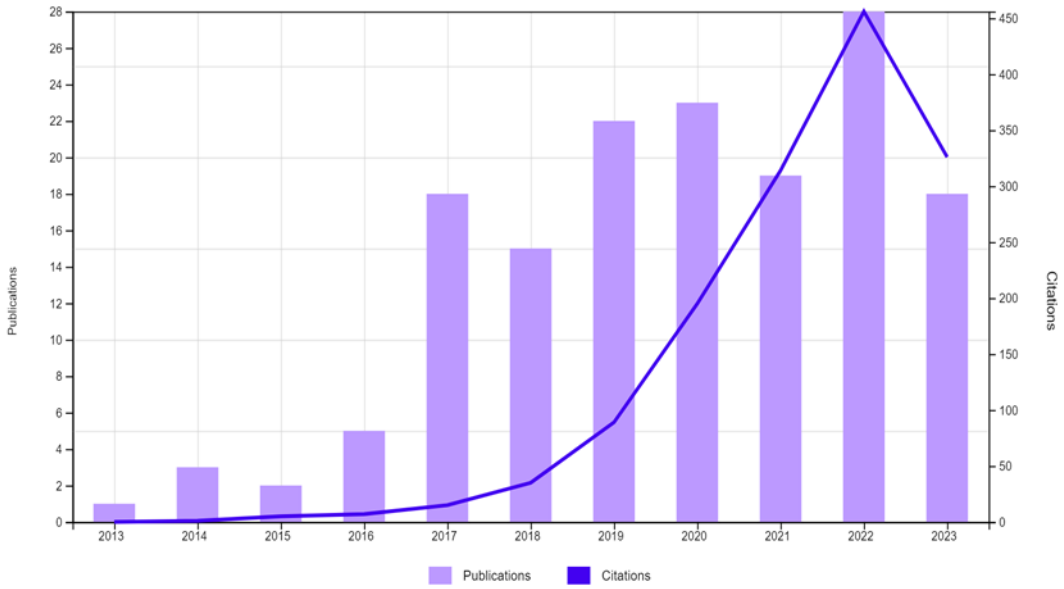

Chart 1. Distribution of Publications and Citations by Years

Table 2 presents the author information of the top 10 most cited studies, the journals in which they were published, the years of publication and the number of citations. According to Table 2, the most cited work is by Bennett and Lemoine (2014), with 293 citations in total.

Table 2. Most Cited Publications

Author Name(s)	Publication Name	Year	Number of Citations
Bennett & Lemoine	What a difference a word makes: Understanding threats to performance in a VUCA world	2014	293
Schoemaker, Heaton & Teece	Innovation, dynamic capabilities, and leadership	2018	210
Milla, Groth & Mahon	Management innovation in a VUCA world: Challenges and recommendations	2018	83
Troise, Corvello, Ghobadian & O'Regan	How can SMEs successfully navigate VUCA environment: The role of agility in the digital transformation era	2022	79
Xing, Liu, Boojihawon, & Tarba	Entrepreneurial team and strategic agility: A conceptual framework and research agenda	2020	53
Pandit, Joshi, Sahay & Gupta	Disruptive innovation and dynamic capabilities in emerging economies: Evidence from the Indian automotive sector	2018	46
Frynas, Mol & Mellahi	Management innovation made in China: Haier's Rendanheyi	2018	34
Baran & Woznyj	Managing VUCA: The human dynamics of agility	2020	33
Seow, Pan & Koh	Examining an experiential learning approach to prepare students for the volatile, uncertain, complex and ambiguous (VUCA) work environment	2019	32
Lechler, Canzaniello, Roßmann, Gracht & Hartmann	Real-time data processing in supply chain management: revealing the uncertainty dilemma	2019	31

In the light of the data obtained, the top 10 most prolific countries are shown in Figure 2. In this context, USA 32 (20.6%), England 25 (16.1%) and India 22 (14.2%) make up the first three places.

Figure 2. Top Broadcasting Countries

The data obtained from the WoS Core Collection database were analyzed in the VOSviewer program. In this context, co-authorship, co-occurence and co-citation analyses were performed and the findings are presented below.

4.1. Co-Authorship Analysis

Co-author analysis, which identifies key researchers, shows the network connections of authors who collaborated on a study (Zupic & Cater, 2015: 435). The more network connections, the greater the connection strength of the author or authors (Çizmecioğlu & Akman, 2021: 11). Correspondingly, a co-author analysis was conducted to determine the strength of the connections between the authors who conducted the most collaborative work on VUCA in the fields of management and business, and 361 authors were determined as a result of the analysis. However, when the number of publications and citations of the authors was selected as "2", it was determined that only "14" authors met the defined threshold value.

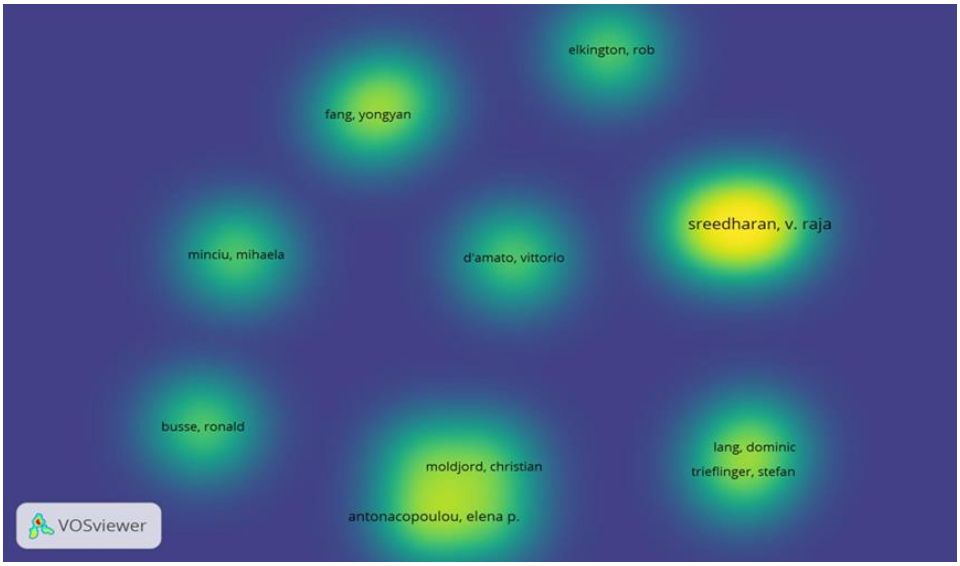

Figure 3. Co-Author Network Image

According to the density map in Figure 3, it is seen that Elena P. Antonacopoulou and Christian Moldjord are the most influential authors in terms of publication and citation. Therefore, the strength of connection between these authors is high.

4.2. Co-Occurence Analysis

A keyword analysis was performed to determine the words most used together with VUCA. 588 words were reached in 154 publications and the analysis was carried out by determining the condition that each keyword be repeated in at least "2" studies. As a result of the analysis, it was determined that "29" words met the threshold value.

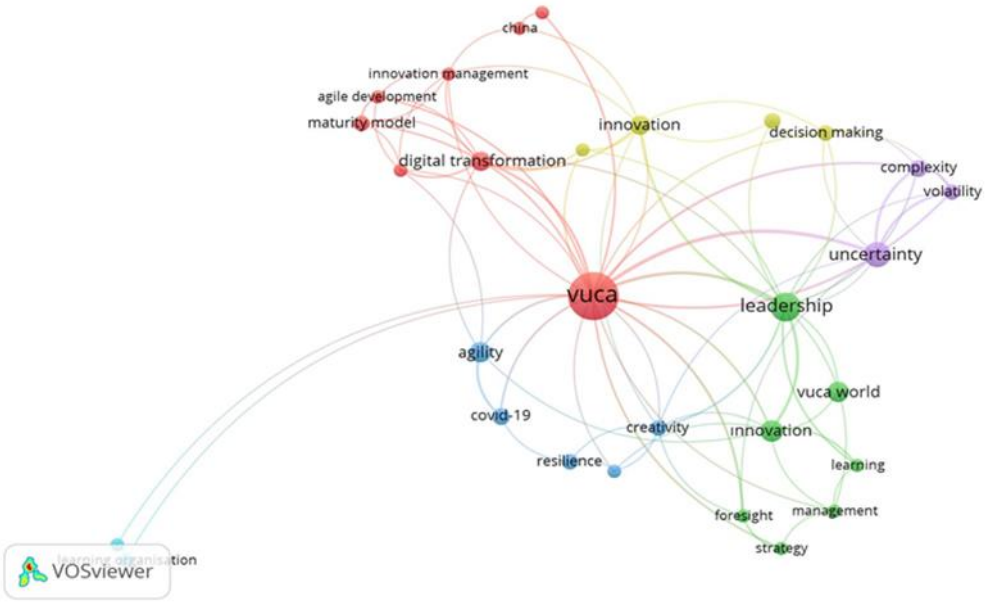

Figure 4. Keyword Network Map

In Figure 4, the most used keywords in VUCA are grouped into 6 different clusters. It was determined that the first cluster was composed of the words agile development china, digital transformation, digitalization, innovation management, maturity model, organizational change and vuca, the second cluster foresight, innovation, leadership, learning, management, strategy and vuca world third cluster agility, covid-19, creativity, management development and resilience the fourth cluster decision making and dynamic capabilities, innovation and knowledge managment the fifth cluster complexity, uncertainty and volatility and the sixth cluster learning organization and organizational learning. The top 10 most used keywords are shown in Table 3.

Table 3. Most Used Keywords

Keyword	Total Link Strength
VUCA	48
Leadership	26
Uncertainty	19
Digital Transformation	16
Innovation	14
Complexity	13
Volatilty	12
Creativity	9
Agility	8
Agile Development	7

4.3. A Co-citation Analysis

Co-citation analysis tries to establish the relationship between publications on the basis of the number of times the two publications are co-cited (Zan, 2019: 504). The analysis provides benefits in terms of reaching the most influential publications and identifying thematic clusters (Donthu, 2021: 288).

4.3.1. Cited References

When the minimum number of citations was set to "5" to determine the network map of co-cited references, it was concluded that "26" out of 7570 references met the threshold value.

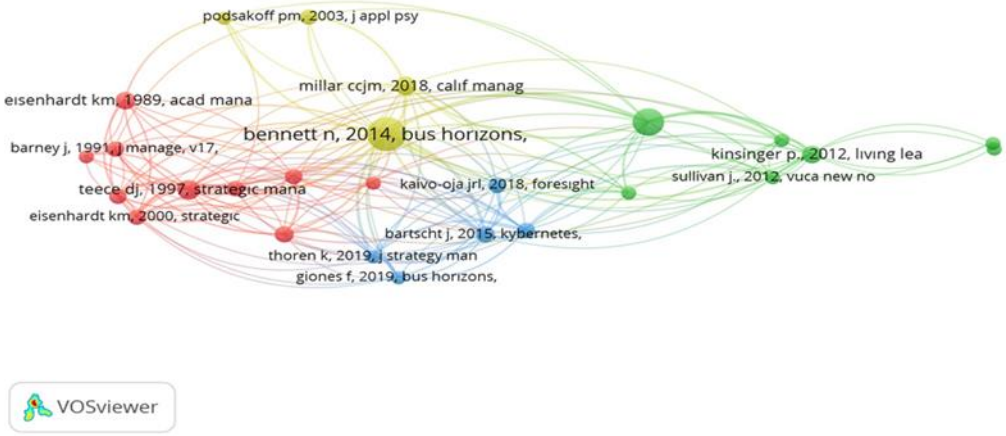

Figure 5. Network Image of Commonly Cited References

As a result of the reference-based co-citation analysis mapping, the most cited work belongs to Bennett and Lemoine (2014). Other most cited references include Bartscht (2015) and Millar (2018).

4.3.2. Cited Sources

When the minimum number of citations was set to "5" to determine the network map of the co-cited references/sources, it was determined that "226" out of 3955 references met the defined threshold value.

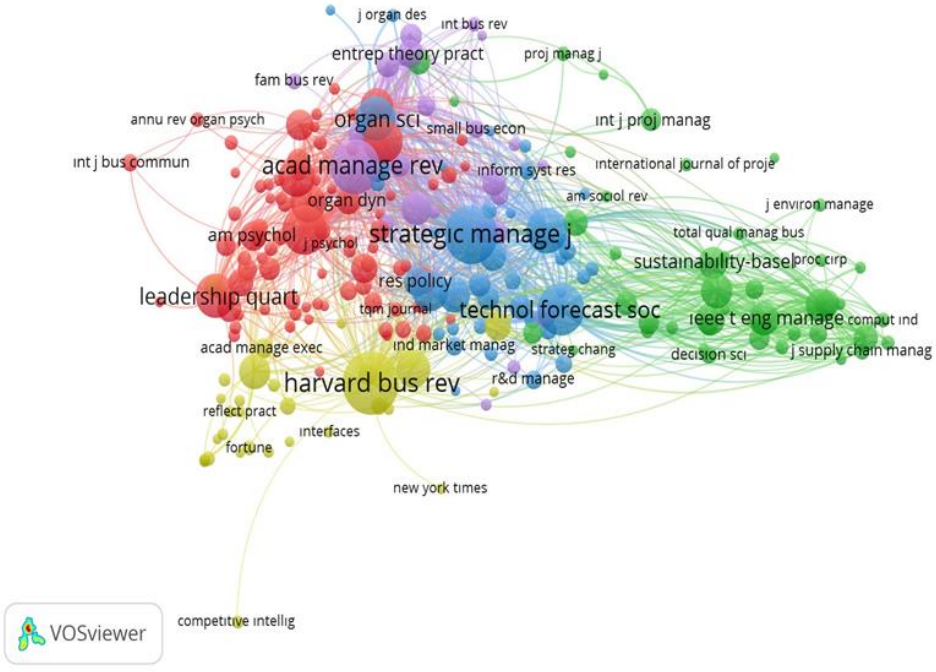

Figure 6. Network Image of Commonly Cited Sources

Figure 6 shows that the most commonly cited sources are Harvard, Strategic, Strategic Management Journal, Academy of Management Review, Technological Forecasting and Social Change, respectively.

4.3.3. Cited Authors

When the minimum number of citations was set to "5" to determine the network map of the co-cited authors, it was concluded that "120" out of 5901 authors met the threshold value.

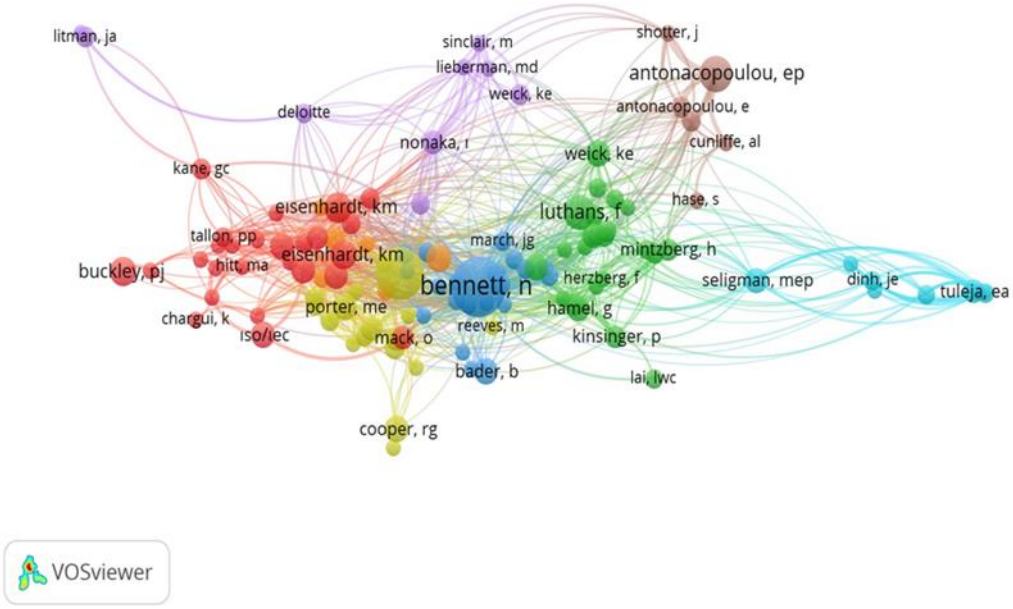

Figure 7. Network Image of Co-Cited Authors

According to Figure 7, the most co-cited authors are Bennett N. Antonacopoulou E.P., & Eisenhardt K.M.

5. Conclusions

Since it aims to observe the progress of the VUCA concept, which has been a topic of research in many fields, this study offers a descriptive perspective in the fields of management and business. 154 studies published in the international literature between 2013 and 2023 were examined by applying visual mapping technique through bibliometric analysis. The reason behind using bibliometric analysis was to make sense of large-scale unstructured data on VUCA, and to reveal and visualize evolutionary details.

As a result of the findings obtained, it can be argued that the majority of the studies on VUCA being in the category of articles is an indication that it is an area that has attracted attention and been investigated by academicians. The low number of document types other than articles reveals the need for more document types (proceeding paper, book chapter, letter and editorial material). However, this should not be treated as a problem. Because, considering that studies on VUCA (including all categories) first began in 2008 and only 2 studies were conducted until 2013, it can be said that the concept is relatively new.

An analysis of the distribution of studies on VUCA by years reveals that although the publications do not exhibit a regular distribution, they have followed a general upward trend. There are models that explain the overall growth of scientific publications in a particular research area. One of these models is Price's law. According to this law, the growth of a research field occurs in four stages: i) the stage of first remarkable studies, in which a small group of scientists start to publish by researching in a new/unstudied area, ii) increase in the number of publications as a result of new perspectives compared to the previous period, iii) strengthening of the body of knowledge and iv) decrease in the number of publications (Bütüner, 2021: 712). Considered VUCA in terms of Price law, it can be positioned in stage ii. However, it is thought that one of the most important reasons for the fact that the most studies on the subject were conducted in 2022 is the Covid-19 pandemic. For the ignorance about the epidemic and

the sudden changes in its course during the pandemic process created ambiguous environments by increasing uncertainty and complexity. Thus, it naturally led to an increased interest in the subject of VUCA. In addition, the significant increases in the number of citations by the years show how interesting and fashionable the subject is.

According to the information obtained from the WoS database, it was seen that the most cited study on VUCA was the study named "What a Difference a Word Makes: Understanding Threats to Performance in a VUCA World" published by Bennett and Lemoine (2014) in the Business Horizons journal. In the aforementioned study, extensive literature was presented with examples related to the VUCA acronym aimed for leaders to protect and improve organizational performance in the VUCA world, and strategies were suggested to turn threats into opportunities. When the distribution of the publications by country is examined, it is seen that the most productive countries (USA, England, India and Germany) are those that attach importance to education and development. This result indicates that there is a positive correlation between the countries of the researchers who enabled the emergence and development of the VUCA concept and the countries that generated the highest number of scientific publications. In the study, co-authorship, co-occurence and co-citation analyses were also mapped as network images. This provided a better evaluation opportunity by visualizing the numerical data obtained as a result of the analysis.

This study is expected to guide the individuals who want to conduct research on VUCA and contribute to the literature. Researchers who aim to work on this subject can have an idea about the relevant literature and plan their research by using this study. On the other hand, the study also has certain limitations. The first limitation that stands out within the scope of the research is related to the data set. The 154 publications evaluated in the study were obtained from the studies in the "management/business" categories from among the WoS categories. In order to reveal the interdisciplinary distribution more clearly in the studies planned to be carried out in this field in the future, evaluation of all types of publications together without any category limit will help present a broader perspective. Another limitation of the study is that the analyzes are made only on the publications listed in the WoS Core Collection. However, bibliometric analyzes; It can also be applied to databases such as SCOPUS, Google Scholar, EBSCO Host, PubMed. In addition, in future studies, researchers can also compare using different visual mapping programs such as Bibexcel, CiteSpace, CopalRed, IN-SPIRE, CRExplorer, Science of Science Tool, VantagePoint, SciMAt.

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ETİK VE BİLİMSEL İLKELER SORUMLULUK BEYANI

Bu çalışmanın tüm hazırlanma süreçlerinde etik kurallara ve bilimsel atıf gösterme ilkelerine riayet edildiğini yazar beyan eder. Bu çalışma etik kurul izni gerektiren çalışma grubunda yer almamaktadır.

ARAŞTIRMACILARIN MAKALEYE KATKI ORANI BEYANI

1. yazar katkı oranı: %100