THE CHALLENGES OF THE VUCA ECONOMY BASED ON THE EVOLUTION OF STUDY

Anindya Mitra Raisnur Putri*[1], Muhammad Hakimi Shafiai[2], Abdul Ghafar Ismail[3], Achmad Syarief[4]

[1, 4] Department of Economics, Faculty of Economics and Management, Universiti Kebangsaan Malaysia (UKM), Malaysia

[2, 3] Center for Sustainable and Inclusive Development Studies (SID), Faculty of Economics and Management, Universiti Kebangsaan Malaysia (UKM), Malaysia

E-mail Correspondence: ukm.anindya@gmail.com

Abstrak: Perhatian para peneliti terhadap VUCA (volatilitas, ketidakpastian, kompleksitas, dan ambiguitas) ekonomi telah meningkat dan menyebar luas terutama setelah pandemi COVID-19. Kajian ini menggunakan analisis bibliometrik untuk membantu lebih memahami dan mengetahui arah penelitian ke depan. Pemahaman ini diharapkan mampu memfasilitasi implementasi strategis dalam membangun stabilitas ekonomi. Studi ini melibatkan 2.819 publikasi yang dikumpulkan dari database Web of Science (WoS) antara tahun 1972-2023. Hasil kajian mendapati tiga kluster penting yang fokus pada (1) ekonomi makro sebagai konsekuensi dari fluktuasi ekonomi, (2) ekonomi strategis dalam menghadapi tantangan ekonomi dan (3) dampak kompleksitas ekonomi terhadap lingkungan. Kesimpulan dari ketiga kluster adalah evolusi penelitian sebelumnya menunjukkan kepedulian yang tinggi terhadap masalah lingkungan untuk keberlanjutan dan kompleksitas ekonomi. Inti eksplorasi dari studi ini dapat digunakan untuk membantu mengidentifikasi kebijakan dan kolaborasi internasional yang diperlukan untuk mengatasi VUCA ekonomi kedepannya.

Kata Kunci: volatilitas, ketidakpastian, kompleksitas, ambiguitas, bibliometrik

Abstract: *Attention of researcher to the VUCA (volatility, uncertainty, complexity, and ambiguity) economy studies has increased and become widespread especially after the COVID-19 pandemic. This study uses bibliometric analysis to better understand and determine future research directions. The understanding is expected to facilitate strategic implementation in building economic stability. The study involved 2,819 publications collected from the Web of Science (WoS) database between 1972-2023. The results of the study found three important clusters that focus on (1) macroeconomics as a consequence of economic fluctuations, (2) strategic economics in dealing with economic challenges and (3) the impact of economic complexity on the environment. The conclusion from the three clusters is the evolution of previous research showing high concern for environmental issues for sustainability and economic complexity. The exploratory core of this study can be used to help identify the policies and international collaboration needed to address economic VUCA in the future.*

Keywords: *volatility, uncertainty, complexity, ambiguity, bibliometric*

INTRODUCTION

The acronym of VUCA is explained as a volatile, uncertain, complex and ambiguous condition that describes the "multipolar new world order". In Lawrence (2013), this situation is described in a business environment that is chaotic, unstable and rapidly changing work settings. Whereas in Johansen (2007), Johansen & Euchner (2013) and Sullivan (2012), this situation describes the contemporary strategic, business, economic and physical environment. The VUCA acronym has definitions that overlap and deviate from one another. According to Taskan et al. (2022) and Hernandez-Santibanez & Mastrolia (2019), this difference is due to the way of understanding changes in a state that has dynamic and constant characteristics. In Billiones (2019), the characteristic of constant change is found in the VUCA construct which is related to disruption trends, daily fluctuations, inherent to the volatile world and unexpected occurrences. However, according to Warwick-Ching (2013) changes in the VUCA economy there are conditions that can be utilized and bring benefits other than just definitions and constructs.

Changes and differences related to the definition and application of VUCA in various fields show the evolution that has occurred in scientific studies. According to McBurney & Novak (2002), Glanzel (2003) and Zupic & Cater (2015), exploring the evolution of a study provides insight into a scientific discipline, detects research gaps and describes collaborative structures between academic institutions or countries. Boyack (2009), Guan et al. (2019) and Benomar et al. (2022), analyzed the evolution of scientific studies using the bibliometric method. For this work, bibliometric analysis can assist in identifying research gaps and individuals active in collaborative networks. Therefore, this study aims to explore the evolution of the study of the VUCA economy.

This study aims to analyze the evolution of the collected studies. Refer to Dabbagh (2019) that to assess the evolution of a study based on bibliometrics at least answers four objectives. First, assess the distribution of VUCA economics publications and citations over the recent years. Second, identifying the research areas that have been mostly investigated in VUCA economics based on the number of publications. Third, assessing the most influential articles in VUCA economics according to the number of citations. Fourth, identify the most popular publishing places that publish articles on VUCA economics. Finally, identify the topmost funding agencies that support research on VUCA economics.

MATERIALS AND METHODS

The articles collected are sourced from the scientific database Web of Science (hereinafter referred to as WoS). The decision to use this database was based on several reasons, namely, WoS as the world's leading scientific citation index, has a high quality and influential research publication, covering more than 24.000 prestigious journals and provides useful analytical features in search engines system. Then the keywords used in the search engine are written in strings: TS=("vuca" OR "econom* Volatil*" OR "econom* uncertain*" OR "econom* complex*" OR "econom* ambigu*"). The search string uses the truncation technique where an asterisk (*) represents a number of letters at the end of a word. For example econom* can include the words economic, economics, economy. Meanwhile, volatile* represents the word volatile, volatility, volatilize, volatileness or uncertain* represents the word uncertainty or uncertainly. Likewise, complex* represents the word complexity or complexion and ambigu* represents the word ambiguity, ambiguous, ambiguously or ambiguousness.

To achieve the objective, the bibliometric analysis uses R version 4.2.2 software to process the WoS database in May 2023 (accessed on 15 May 2023). Search is limited by title with keywords related to VUCA economics using the string "VUCA" and any acronyms starting with the string "econom*". In addition, searching is limited by language (English) and document types (article), therefore Table 1 shows that the database presents 2,819 scientific articles published in the period of 1972-2023. Although the use of the acronym of VUCA is used in Johansen (2007), in scientific articles it was found entering 2009 in Bodenhausen & Peery (2009). However, the issue of VUCA has been partially used since more than 3 decades ago, for example, regarding economic uncertainty in Bucher & Reece (1972), Taylor & North (1976), Inglehart & Rabier (1978) and economic complexes in Shatalin (1978), Suits & Fisher (1985), etc.

| Description	Results
Main information of data	
Timespan	1972-2023
Sources	1,437
Documents	2,819
Annual growth rate	10.16
Document average age	6.35
Average citation per doc	20.43
References	115,636
Document contents	
Keywords plus (ID)	4,170
Author's keywords	7,228
Authors	
Authors	6,629
Authors of single-authored docs	655
Authors collaboration	
Single-authored docs	718
Co-authors per doc	2.78
International co-authorships %	31.32

Table 1. Descriptive information on dataset

RESULT AND DISCUSSION

Related to the first objective, Figure 1 shows the increasing trends in publication numbers. We found that there is a concurrent situation between the economic recession that is happening in the world and increased studies on the VUCA economy. Referring to Kose et al. (2021), there were four global recessions that occurred in the world after World War II, namely in 1975, 1982, 1991 and 2009. Meanwhile, in the IMF (2022), Lund et al. (2018), economic crises are grouped in every decade. Before 1990, Figure 1 shows publications on the VUCA economy of no more than 2 articles per year until the 1990-1999 decade, studies increased more than 6 times or an average of 7 articles per year. This increase coincided with the economic boom experienced by the USA which led to an economic expansion after the recession in March 1991. Then in the following decade, the increase in the number of articles during 2000-2009 occurred after the economic depression in the early 2000s including the great recession (2007-2009) where the increase in the number of articles reached an average of 18 studies each year. Then in the last decade (2010-2019), many events occurred that affected the economy, stock market and interest rates which coincided with an increase in the

number of articles to an average of 113 articles per year. And this number continues to increase sharply along with the crisis caused by "total lockdown" throughout the world in 2020 due to the Covid-19 pandemic, along with the tragedy in the last three years the number of articles has increased to almost 304 articles a year.

Figure 1. Yearly publication trends
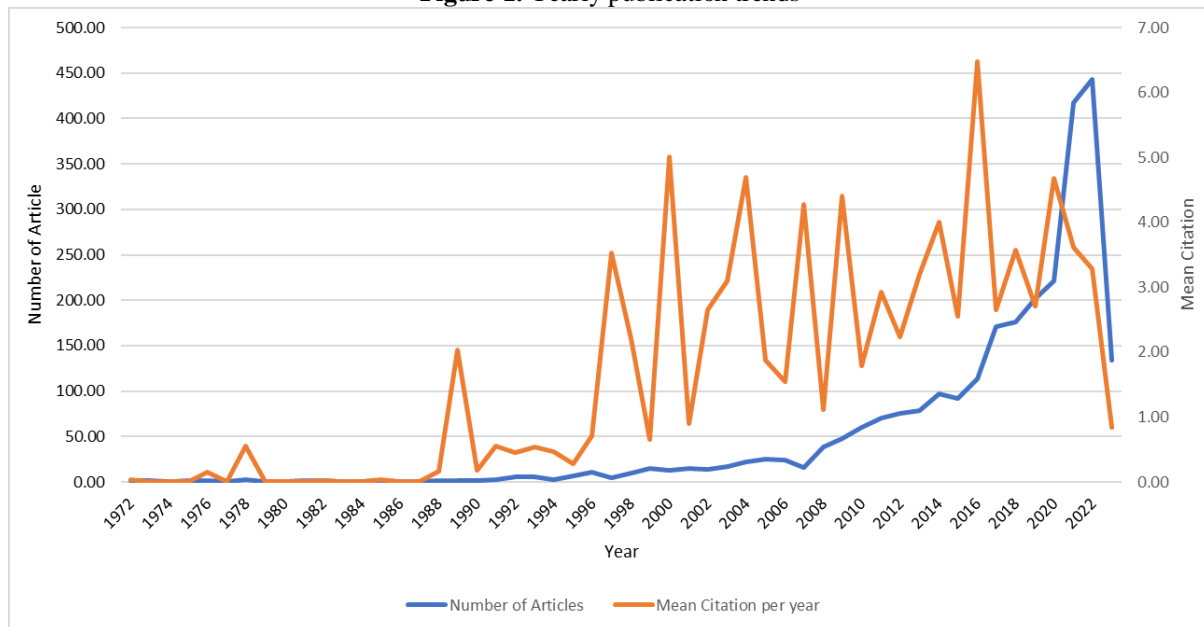
In addition to the increase in the number of articles, the evolution of VUCA economic studies was observed based on the number of article citations. Based on the article citations, Figure 1 shows a fluctuating cycle, where the number of citations per year only occurs in certain years. The highest annual article citations belong to articles published in 2016, which coincided with the Chinese renminbi (RMB) joining in the special drawing right (SDR) basket. Referring to Keddad & Sato (2022), Zhang et al. (2021), Zhao (2019), where this event had an impact on changes in China's monetary structure in the Asian region and had a global macroeconomic impact. Likewise, the highest citation belongs to articles published in 2000 that followed the financial crisis experienced by developed countries, especially the European Union. Another case is the increase in the citation of the article in 2004 coincided with the collapse of the subprime mortgage market which led to a credit crunch in the global banking system and a precipitous drop in bank lending.

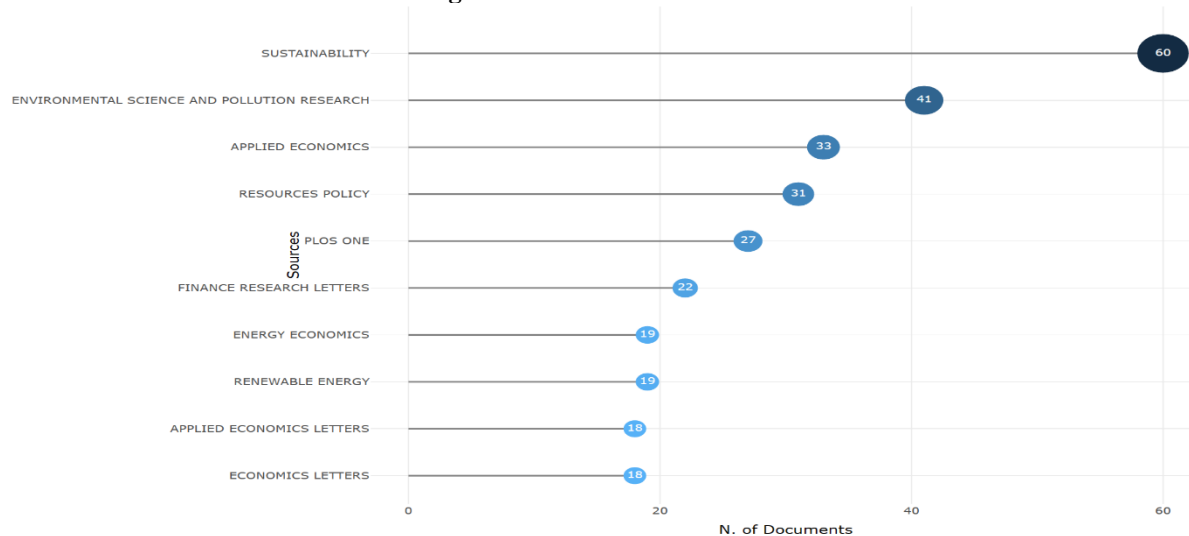**Figure 2.** Research área coverage of VUCA articles indexed by WoS
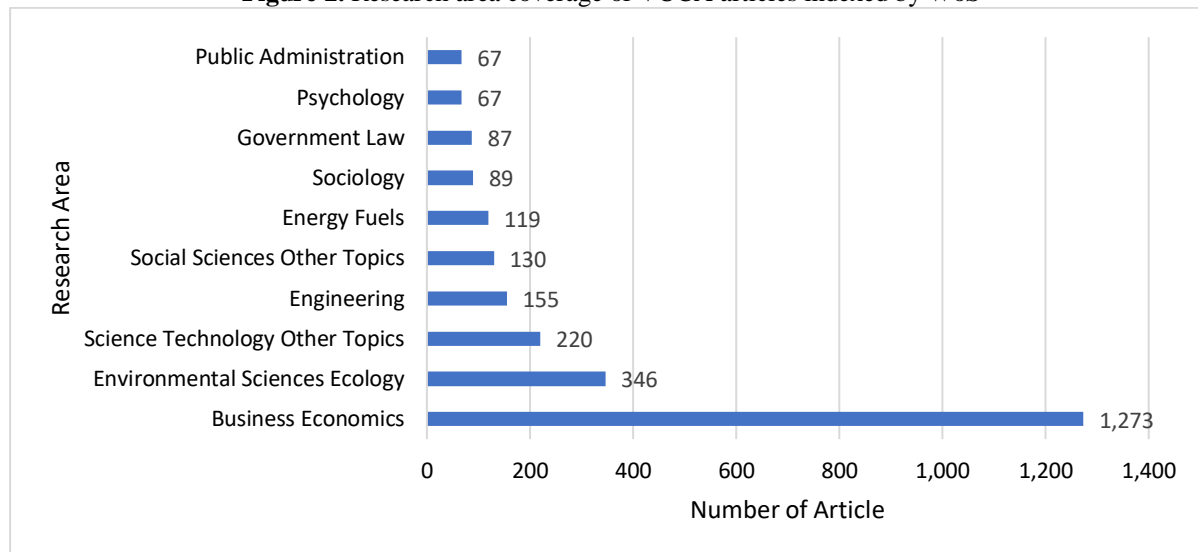
For the second objective, Figure 2 shows the top 10 research areas in the VUCA economy study. It should be noted that each article may cover more than one research area. Business economics (1,273 articles) is the area with the most number of articles published. In the last 5 years, the business economics area has dominated 45% annually, while other areas have less than 12%. Areas that low articles published related to the VUCA economy are mostly medical areas such as urology, rehabilitation, immunology, dermatology, surgery and others. Even studies in the social and humanities area are only 1 study each year.

Figure 3. Most global cited documents
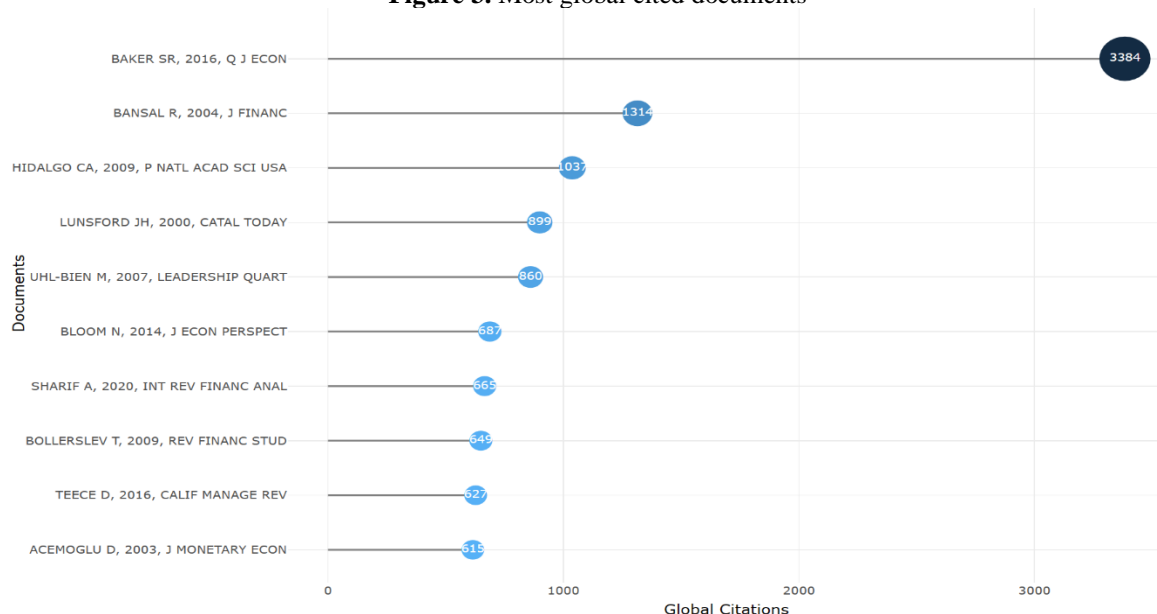
In the aspect of the situation for the third objective, Figure 3 shows Baker et al. (2016) and Bansal & Yaron (2004) are relevant studies in the business economic area based on the most citations, where Mealy & Teytelboym (2022), Shahzad et al. (2022), Romero &

Gramkow (2021) are the latest study in this area which focuses on the issue of economic complexity. Besides that, in the environmental sciences ecology area, the study of Ricke et al. (2018) is the study with the highest citation where estimates of the social cost of carbon (SCC) are based on climate models, empirical climate-driven economic damage and socio-economic projections. Meanwhile, Hidalgo & Hausmann (2009), Tacchella et al. (2012) Dogan et al. (2021) have a relevant study in the science technology area.

Related to the most popular publication venue for VUCA economy paper as the fourth objective. Figure 4 shows that popular publisher includes Elsevier (668 articles), Taylor & Francis (341 articles), Springer Nature (289 articles), Wiley (250 articles). MDPI (147 articles), Emerald Group Publishing (137 articles) and Sage (122 articles). Based on publication titles, Figure 5 shows that the highest publication titles include Sustainability 60 articles), Environmental Science and pollution research (41), applied economics (33), Resources Policy (31 articles), PLOS One (28 articles), Finance research letters (22 articles) and others published under 20 articles during the period 1972-2023.

Figure 4. Core sources Bradford's Law

Figure 5. Most relevant sources

Finally, the topmost funding agencies that support research on VUCA economics as the fifth objective. It should be noted that in one article it is possible to be funded by more than 1 funding agency. There are 3,405 funding agencies involved in financing studies on the VUCA economy. Figure 6 shows that the funding agency that plays a large role in the study of the VUCA economy is the National Natural Science Foundation of China Nsfc (4% of the studies collected), three agencies with over 1% (UK Research Innovation Ukri, European Commission and National Science Foundation Nsf, while other agencies are less than 1%. As the top agency (National Natural Science Foundation of China Nsfc) has been established in the 1980s, this agency has only financed studies in the VUCA economy since 2012 until now. In addition, this agency is affiliated mostly with organizations in China, however, there are also overseas organizations such as RLUK in the UK and Ireland, MIT in Cambridge and several other organizations outside the country.

Figure 6. Most funding agencies
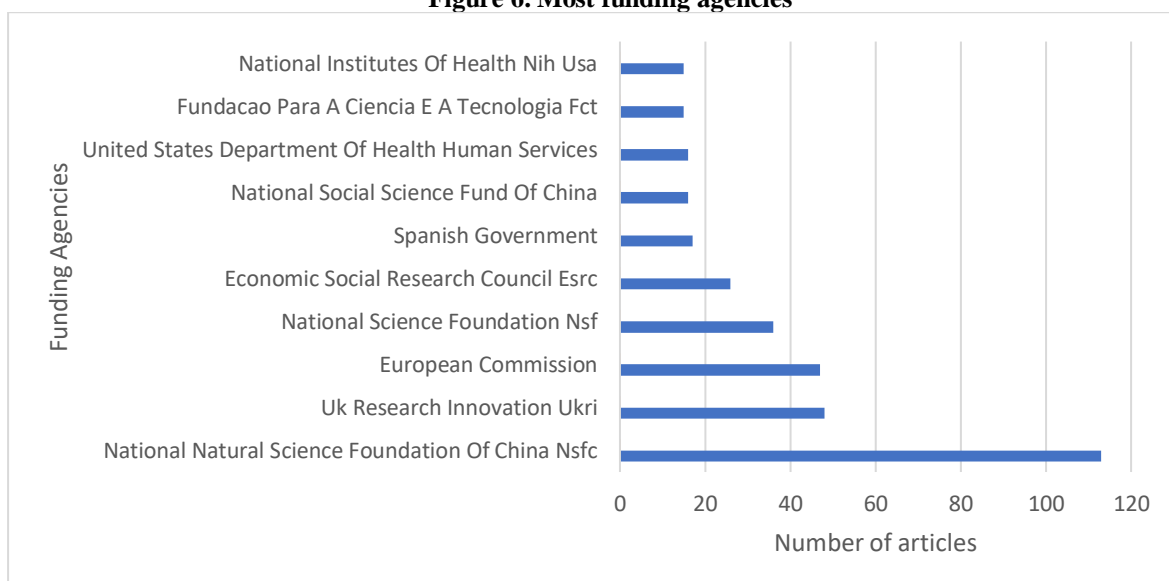
CONCLUSION

Based on citations that exceed 1,000, the article that is widely referred to Baker et al. (2016) regarding the new index of economic policy uncertainty (EPU) in America at the micro and macro levels. The next article with the most citations is Bansal & Yaron (2004) regarding economic uncertainty based on a consumption model related to long-run predictable components and consumption volatility. Finally, Hidalgo & Hausmann (2009) regarding the central role of economic growth and development in the complexity of a country's economy through an analysis of bipartite trade networks. However, there were 599 articles out of 2,819 articles submitted that were not cited by other articles.

A significant increase especially since the combined challenge series (VUCA) by Johansen (2007), we found that the VUCA studies either individually or combined reach the maximum number in 2021 (469 articles) and 2022 (458 articles). Although in the last three years, the issues of study have focused more on individual issues regarding economic complexity and uncertainty. Despite the increase in the number of studies, the evolution is shown in Figure 1 with an increasing trend with respect to the number of citations. This increase confirms that the studies conducted discuss issues that continue to develop every year so that the evolution related to the VUCA economy undergoes significant changes.

However, we found that the evolution of the study underwent changes based on the responses to events that had affected the economic, monetary or financial sectors. So that studies that discuss global events can be a source for subsequent articles which then cite them. Observations made in this study grouped these events based on the decade frame, where in every decade there is a global event that has an impact on the state of the economy. Based on some of the observations presented in this study, it can provide guidelines for subsequent studies based on the character of evolution in the study of the VUCA economy

REFERENCES

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *Quarterly Journal of Economics*, *131*(4). https://doi.org/10.1093/qje/qjw024

Bansal, R., & Yaron, A. (2004). Risks for the long run: A potential resolution of asset pricing puzzles. In *Journal of Finance* (Vol. 59, Issue 4). https://doi.org/10.1111/j.1540-6261.2004.00670.x

Benomar, L., Elferjani, R., Hamilton, J., O'Neill, G. A., Echchakoui, S., Bergeron, Y., & Lamara, M. (2022). Bibliometric Analysis of the Structure and Evolution of Research on Assisted Migration. In *Current Forestry Reports* (Vol. 8, Issue 2). https://doi.org/10.1007/s40725-022-00165-y

Billiones, R. (2019). Thriving (and not just surviving) in a VUCA healthcare industry. *Medical Writing*, *28*(1).

Bodenhausen, G. v., & Peery, D. (2009). Social Categorization and Stereotyping In vivo : The VUCA Challenge . *Social and Personality Psychology Compass*, *3*(2). https://doi.org/10.1111/j.1751-9004.2009.00167.x

Boyack, K. W. (2007). Using detailed maps of science to identify potential collaborations. *Proceedings of ISSI 2007 - 11th International Conference of the International Society for Scientometrics and Informetrics*.

Bucher, G. C., & Reece, J. E. (1972). What Motivates Researchers in Times of Economic Uncertainty? *Research Management*, *15*(1). https://doi.org/10.1080/00345334.1972.11756103

Dabbagh, M., Sookhak, M., & Safa, N. S. (2019). The evolution of blockchain: A bibliometric study. *IEEE Access*, *7*. https://doi.org/10.1109/ACCESS.2019.2895646

Dogan, N., Sahbaz, T., & Diracoglu, D. (2021). Effects of mobilization treatment on sacroiliac joint dysfunction syndrome. *Revista Da Associacao Medica Brasileira*, *67*(7). https://doi.org/10.1590/1806-9282.20210436

Glänzel, W. (2003). Bibliometrics as a research field. *Techniques*, *20*.

Guan, Y., Kang, R., & Liu, J. (2019). Evolution of the field of ecological restoration over the last three decades: a bibliometric analysis. In *Restoration Ecology* (Vol. 27, Issue 3). https://doi.org/10.1111/rec.12899

Hernandez-Santibanez, N., & Mastrolia, T. (2019). Contract theory in a VUCA world. *SIAM Journal on Control and Optimization*, *57*(4). https://doi.org/10.1137/18M1184527

Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(26). https://doi.org/10.1073/pnas.0900943106

IMF. (2022). In *Global Financial Stability Report, October 2022*. https://doi.org/10.5089/9798400219672.082

Inglehart, R., & Rabier, J. R. (1978). Economic Uncertainty and European Solidarity: Public Opinion Trends. *The Annals of the American Academy of Political and Social Science*, *440*(1). https://doi.org/10.1177/000271627844000108

Johansen, B. (2007). Get there early: sensing the future to compete in the present. San Francisco, CA: Berrett-Koehler.

Johansen, B., & Euchner, J. (2013). Navigating the VUCA world, An interview with Bob Johansen. *In Research Technology Management* (Vol. 56, Issue 1). https://doi.org/10.5437/08956308X5601003.

Keddad, B., & Sato, K. (2022). The influence of the renminbi and its macroeconomic determinants: A new Chinese monetary order in Asia? In *Journal of International*

Financial Markets, Institutions and Money (Vol. 79). https://doi.org/10.1016/j.intfin.2022.101586

Kose, M. A., Nagle, P., Ohnsorge, F., & Sugawara, N. (2021). Global Waves of Debt: Causes and Consequences. In *Global Waves of Debt: Causes and Consequences*. https://doi.org/10.1596/978-1-4648-1544-7

Lawrence, K. (2013). Developing Leaders in a VUCA Environment. UNC Executive Development.

Lund, S., Mehta, A., Manyika, J., & Goldshtein, D. (2018). A Decade After the Global Financial Crisis: What Has (and Hasn't) Changed? *McKinsey Global Institute*, *September*.

McBurney, M. K., & Novak, P. L. (2002). What is bibliometrics and why should you care? *IEEE International Professional Communication Conference*. https://doi.org/10.1109/ipcc.2002.1049094

Mealy, P., & Teytelboym, A. (2022). Economic complexity and the green economy. *Research Policy*, *51*(8). https://doi.org/10.1016/j.respol.2020.103948

Ricke, K., Drouet, L., Caldeira, K., & Tavoni, M. (2019). Author Correction: Country-level social cost of carbon (Nature Climate Change, (2018), 8, 10, (895-900), 10.1038/s41558-018-0282-y). In *Nature Climate Change* (Vol. 9, Issue 7). https://doi.org/10.1038/s41558-019-0455-3

Romero, J. P., & Gramkow, C. (2021). Economic complexity and greenhouse gas emissions. *World Development*, *139*. https://doi.org/10.1016/j.worlddev.2020.105317

Shahzad, U., Madaleno, M., Dagar, V., Ghosh, S., & Doğan, B. (2022). Exploring the role of export product quality and economic complexity for economic progress of developed economies: Does institutional quality matter? *Structural Change and Economic Dynamics*, *62*. https://doi.org/10.1016/j.strueco.2022.04.003

Shatalin, S. (1978). The Economy of the USSR - A Single National Economic Complex. *Problems in Economics*, *21*(4). https://doi.org/10.2753/pet1061-1991210424

Sullivan, J. (2012). VUCA: the New Normal for Talent Management and Workforce Planning. *Dr John Sullivan: Talent Management Thought Leadership*.

Suits, D. B., & Fisher, R. C. (1985). A Balanced Budget Constitutional Amendment: Economic Complexities And Uncertainties. *National Tax Journal*, *38*(4). https://doi.org/10.1086/ntj41792107

Tacchella, A., Cristelli, M., Caldarelli, G., Gabrielli, A., & Pietronero, L. (2012). A new metrics for countries' fitness and products' complexity. *Scientific Reports*, *2*. https://doi.org/10.1038/srep00723

Taskan, B., Junça-Silva, A., & Caetano, A. (2022). Clarifying the conceptual map of VUCA: a systematic review. In International Journal of Organizational Analysis (Vol. 30, Issue 7). https://doi.org/10.1108/IJOA-02-2022-3136

Taylor, B. W., & North, R. M. (1976). The Measurement of Economic Uncertainty in Public Water Resource Development. *American Journal of Agricultural Economics*, *58*(4_Part_1). https://doi.org/10.2307/1238806

Warwick-Ching, L. (2013), "Currency wars: volatility provides profit opportunity", The Financial Times, available at: www.ft.com/intl/cms/s/0/e17e1ab0-8714-11e2-9dd7-00144feabdc0.html#axzz2r3QHfbxW.

Zhang, B., Wang, S., Wei, Y., & Zhao, X. (2021). Impact of the RMB Joining in the SDR Basket on Its Internationalization from the Perspective of Risk Spillover. *Journal of Systems Science and Complexity, 34*(1). https://doi.org/10.1007/s11424-020-9215-8.

Zhao, D. (2019). Study on the Influence of RMB's Entry into SDR on the Interest Rate of

SDR. *American Journal of Industrial and Business Management, 09*(02). https://doi.org/10.4236/ajibm.2019.92018.

Zupic, I., & Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, *18*(3). https://doi.org/10.1177/1094428114562629