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# Bibliometric Analysis of Published Research on Russia-Ukraine War Using VOSviewer

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## ABSTRACT

What the world was fearing since the built up of army on Russia-Ukraine border, came true on 24th February, 2022 when Russia launched its "special military operation" to invade Ukraine. Millions of Ukrainians flee their country seeking refuge in the neighbouring European countries. The war not only generated a global discussion among the governments but also among the scientific community. All around the globe the researchers have been studying and publishing based on this war. This study performs a bibliometric analysis on these published documents using Dimensions database. A total of 657 documents in the form of research articles, preprints, monographs and chapters were studied. The analysis was performed using VOSviewer and presented in the form of tables and figures. The study showed the global nature of war where the most documents were published, both in the terms of institutions and researchers, from India. United States found to be the top contributing country. The study also depicts that the researches based on 'Russia-Ukraine war' included topics related to equity markets, business, climate change, energy security, food security, public health and global implication of war. To the best of the knowledge of the researchers this is the first bibliometric study based on this war.

## HIGHLIGHTS

◉ Researchers from all around the world have been studying the Russia-Ukraine war in various aspects.
◉ The studies have focused on business, economy, energy, food and health related topics.

**Keywords:** Russia-Ukraine war, Bibliometric analysis, VOSviewer, Dimensions

After a massive built-up of army at the Russia-Ukraine border, on 24th February, 2022 Russian army was ordered to invade Ukraine which was termed as 'Special military operation' by the Russian side (Lim *et al.* 2022; Walsh, 2022). The world including Ukraine was still battling the COVID-19, then this war hit hard and 18 million people are estimated to be the victims (Chumachenko & Chumachenko, 2022). It has caused serious geopolitical and humanitarian crisis threatening the geopolitical stability (Orhan, 2022). On 23rd August, 2022, after six months of war, still nearly 6,865,625 Ukrainians have sought refuge in European countries (UNHCR, 2022). The war has a severe impact on the several aspects of society including business, health, education and economy

(Boungou & Yatie, 2022; Federle *et al.* 2022; Mbah & Wasum, 2022; Sheather, 2022; Srichawla *et al.* 2022; Stadler *et al.* 2022). The stock market all around the world shown downward trends immediately with the start of the war (Boungou & Yatie, 2022; Federle *et al.* 2022). War is not only causing the economic devastation but endangers million to be pushed to malnutrition (Osendarp *et al.* 2022). The food prices have been rising ever since the war has broken out (Wang *et al.* 2022), women and children are the

most vulnerable to it (Gonçalves Júnior *et al.* 2022; Osendarp *et al.* 2022). War leaves an everlasting damage on to the children (Gonçalves Júnior *et al.* 2022). Apart from these impacts, war also takes a toll on the environment due to the use of the weapons (Stadler *et al.* 2022).

As the war has such devastating effects, this study seeks to find answer to the following questions—

- What kind of research happening during this period of war?
- Which institutions and researchers have been contributing to scientific knowledge?
- Which are the most impactful research contributions?

## METHODOLOGY

As the systematic literature reviews have been of high relevance for the researches to develop the research questions (Sweileh, 2020) and to explore the knowledge of a scientific area. Similarly bibliometric analysis follows the similar method and provides a comprehensive map of knowledge of scientific field (Sweileh, 2020). The first step of bibliometric is to find the suitable database. There multiple databases available such as Scopus, WoS, Google Scholar, Dimensions etc. Out of these Scopus and WoS require subscription whereas Google Scholar and Dimension are free to use. Google Scholar is confusing (Stadler *et al.* 2022) hence Dimensions database was selected to carry out this study. It is a free to use database with over 110 million publications (Herzog *et al.* 2020; Hook *et al.* 2021).

## DATA ANALYSIS

### Dataset

To find the best results multiple keywords combinations were fed into Dimensions database. The best results were obtained by applying following keyword combination:

"Russia-Ukraine war" OR "Russia-Ukraine conflict" OR "Ukraine war" OR "Russia-Ukraine" OR "invasion of Ukraine"

No language related restrictions were applied for obtaining the data to avoid any kind of biases. To obtain the most suitable data filter on the type and year of publication was applied and only article,

preprints, monographs and chapter were included which were published in 2022.

### Analysis

Van Eck and Waltman in 2010 developed a freely available data visualization software VOSviewer (van Eck & Waltman, 2010), which has been used previously by the researchers to perform bibliometric analysis (Atsız *et al.* 2022; Garrigos-Simon *et al.* 2018; Stadler *et al.* 2022; Vishwakarma & Mukherjee, 2019). It analyses authorship, citations, co-occurrence, and geographical spread of research.

## RESULTS

### General features of data

Though there have been publications prior to 2022 as well, yet to understand the impact of current situation, the contributions of 2022 were only considered. It presented a total of 657 records for analysis; a breakdown of these on the basis of type of publication is given below in Table 1.

**Table 1:** Types of publications

| Publication type | No. of publications |
|---|---|
| Research articles | 533 |
| Pre-print | 103 |
| Chapters | 14 |
| Monograph | 7 |

**Source:** *Author's own computation (obtained from Dimensions).*

### Major research categories

A classification of publication in top five research categories support above mentioned observation that war impacts society, business, economy etc. (Boungou & Yatie, 2022; Federle *et al.* 2022; Mbah & Wasum, 2022; Sheather, 2022; Srichawla *et al.* 2022; Stadler *et al.* 2022). It is clear from the classification in (Table 2) of the publication around 1/3rd of the total publications fall under 'Studies in Human Society' and around 27% fall under 'Political Science'.

**Table 2:** Classification on basis of research categories

| Category | Publications | Citation | Citation mean |
|---|---|---|---|
| Studies in Human Society | 211 | 72 | 0.34 |

| Political Science | 183 | 52 | 0.28 |
|---|---|---|---|
| Economics | 94 | 34 | 0.36 |
| Applied Economics | 92 | 34 | 0.37 |
| Medical and Health Sciences | 67 | 50 | 0.75 |

**Source:** *Author's analysis using VOSviewer.*

## Top contributing institutions and countries

As it is shown in Table 3 'Magadh University' from India and 'University of Oxford' from UK are the leading contributor institutions both in terms of documents and citations. These have contributed 5 and 4 documents and have received 22 and 10 citations respectively. Among the top contributing institutions with a criteria of minimum 3 documents, the institutes are geographical well spread, includes institutions from Asia, Europe, United Kingdom (UK) and United States (USA). Total link strength (TLS) for all the top institutions is zero.

**Table 3:** Top performing institutions

| Organization | Documents | Citations | TLS |
|---|---|---|---|
| Magadh University | 5 | 22 | 0 |
| University of Oxford | 4 | 10 | 0 |
| Medical University of Warsaw | 4 | 5 | 0 |
| Taras Shevchenko National University of Kyiv | 4 | 1 | 0 |
| Aarhus University | 3 | 1 | 0 |
| George Mason University | 3 | 0 | 0 |
| Harvard University | 3 | 4 | 0 |
| Imperial College London | 3 | 0 | 0 |
| Riga Stradiņš University | 3 | 1 | 0 |
| Sumy State University | 3 | 1 | 0 |
| University of Edinburgh | 3 | 0 | 0 |
| Zhejiang University | 3 | 1 | 0 |

**Source:** *Author's analysis using VOSviewer.*

When country wise analysis was performed United States and United Kingdom are the top contributors with 57 and 42 documents respectively. Whereas United Kingdom and India lead in number of citations with 65 and 47 citations each; United Kingdom, United States and India also lead in total link strength (TLS).

**Table 4:** Top contributing nations

| Country | Documents | Citations | TLS |
|---|---|---|---|
| United States | 57 | 46 | 20 |
| United Kingdom | 42 | 65 | 28 |
| Ukraine | 32 | 19 | 3 |
| Germany | 22 | 19 | 15 |
| India | 20 | 47 | 19 |
| China | 16 | 6 | 7 |
| Poland | 13 | 14 | 8 |
| Italy | 10 | 9 | 2 |
| France | 9 | 11 | 8 |
| Russia | 9 | 13 | 4 |

**Source:** *Author's analysis using VOSviewer.*

## Top contributing authors

Dharen Kumar Pandey from Magadh University, India has contributed the most documents (7) followed by Vineeta Kumari from the same institution (3) both also lead in terms of citations. To find out the top contributing authors criteria of minimum of 2 documents and minimum 5 citations was fixed, which put forth nine contributors as presented in Table 5.

**Table 5:** Top contributing authors

| Author | Documents | Citations | TLS |
|---|---|---|---|
| Pandey, Dharen Kumar | 7 | 28 | 13 |
| Kumari, Vineeta | 3 | 22 | 9 |
| Alam, Mehtab | 2 | 15 | 2 |
| Boubaker, Sabri | 2 | 18 | 4 |
| Goodell, John W. | 2 | 18 | 4 |
| Neto, Modesto Leite Rolim | 2 | 5 | 0 |
| Oliyide, Johnson A. | 2 | 10 | 0 |
| Uchida, Ricardo Riyoiti | 2 | 5 | 0 |
| Umair, Mohammad | 2 | 15 | 2 |

**Source:** *Author's analysis using VOSviewer.*

As the authors have received TLS, a network analysis was performed for co-authorship (Fig. 1). It presented 28 co-authorship links among 8 authors, none from Table 5, spread in 2 clusters.
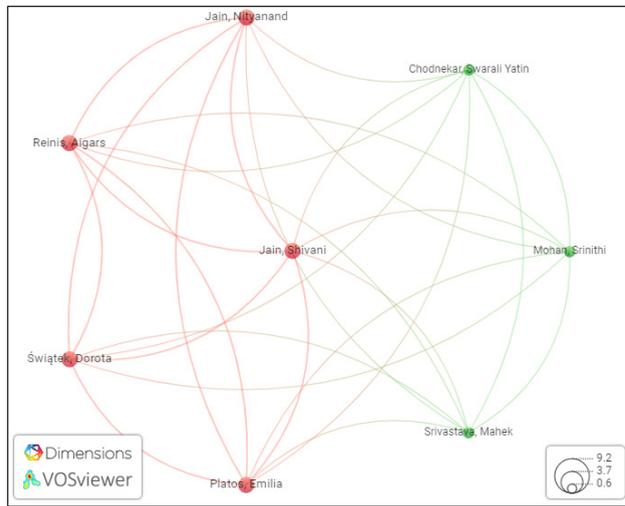
Source: *Author's analysis using VOSviewer*

**Fig. 1:** Co-authorship network analysis

## Most cited documents

When a filter of minimum 8 citations was applied, a total of 9 documents were received. Document by (Boubaker *et al.* 2022) has received highest citations (18) followed by (Mbah & Wasum, 2022) (13). Other than these documents by (Umar *et al.* 2022) and (Mišík, 2022) have received 11, 10 and 10 respectively while rest all documents have received 8 citations each. These documents have studied markets, economic aspects, energy security, climate change and impact of war on public health.

**Table 6:** Most cited documents

| Document | Citations | Links | Key aspect discussed |
|---|---|---|---|
| (Boubaker *et al.* 2022) | 18 | 0 | Equity markets |
| (Mbah & Wasum, 2022) | 13 | 0 | Economic impact of war on USA, UK, Canada and Europe |
| (Umar *et al.* 2022) | 11 | 0 | Impact of conflict on global markets |
| (Adekoya *et al.* 2022) | 10 | 0 | Linkage of oil with major financial assets during war |
| (Mišík, 2022) | 10 | 0 | Need of developing an energy policy for energy security |
| (Deng *et al.* 2022) | 8 | 0 | Equity market to suggest a strong climate policy |
| (Gaind & Else, 2022) | 8 | 0 | Condemnation of Russia for invasion |
| (Leon *et al.* 2022) | 8 | 0 | Public health consequences of war |
| (Tosun & Eshraghi, 2022) | 8 | 0 | Impact of corporate decision during war |

Source: *Author's analysis using VOSviewer.*

## Keyword analysis

An analysis of keywords featured in title and abstract was performed in VOSviewer with a filter of minimum 20 occurrences which resulted in 159 documents to be shortlisted. Mathematical function of VOSviewer presents 60% of relevant keywords hence 95 keywords were displayed. The authors then eliminated repetitive words and the names of the countries manually. Finally 33 keywords were presented in the form of density visualization in Fig. 2. These words were spread over 6 clusters. Market (193), price (154), economy (153), security (104) and consequences (98) were the most occurring words. Child (2.99), crime (2.96) and economic indicators (2.69) have the highest relevance score.
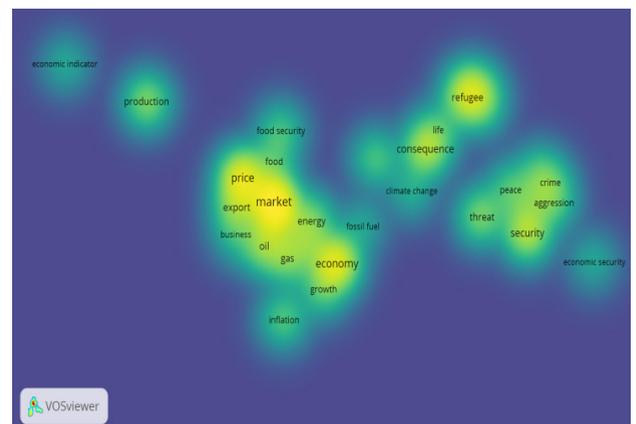


Source: *Author's analysis using VOSviewer*

**Fig. 2:** Density visualization of keywords

## CONCLUSION

The world has become a global village; something happening in a region has global impact. This is also true in the case of war as well (Umar *et al.* 2022). The analysis of scientific publications base on Russia-Ukraine war also reflects as the top contributing institutions and authors comes from the countries other than Russia and Ukraine. Geographical spread of the documents, institutions and researchers reflect the global implications of this war. Most contributing institution and author are from India, top contributing nation is US. The observations of

literature review that the war has a devastating impact on the several aspects of society including business, health, education and economy (Boungou & Yatie, 2022; Federle *et al.* 2022; Mbah & Wasum, 2022; Sheather, 2022; Srichawla *et al.* 2022; Stadler *et al.* 2022) has been supported by the analysis of the top cited documents and an analysis of keywords from title and abstract of documents. It reflects that the research based on Russia-Ukraine war is happening in economics, business, energy security, public health related aspects.

## LIMITATIONS AND FUTURE STUDIES

Like any other study, this study also has its limitations. It is based on only one database whereas a more comprehensive study can be conducted by using other more reputed databases such as Scopus and WoS. This, as per the knowledge of the authors, is the first of its kind study on Russia-Ukraine war of 2022, the future studies may take cue for conducting future studies from the various research aspects presented in this.

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