

Quo Vadis Vaccine Research Trends of Coronavirus Disease-19 in Indonesia and Malaysia: A Bibliometric Analysis

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Abstract

The Coronavirus Disease-19 (COVID-19) has become a centre of attention for several countries, including Indonesia and Malaysia. The two countries are trying to maintain the stability and security of each country from the impact that will be caused. The Indonesian and Malaysian governments decided to import vaccines from several countries to reduce the spread of the disease in the global community. However, to deal with the limitations of imported vaccines, Malaysia and Indonesia are conducting various studies related to COVID-19 vaccine research. This study will observe how Indonesia and Malaysia respond to vaccine research trends related to COVID-19 from 2020 to 2022. This study uses a qualitative descriptive method that is produced through bibliometric analysis to analyse data collected from Scopus. In addition, the authors also use several kinds of literature from reputable journals to add references and information related to the research. The results of the bibliometric analysis show that Malaysia has paid more attention to research publications related to COVID-19 than Indonesia. However, Indonesia has received official approval for its first vaccine since September 2021, while Malaysia is in the process of developing its own vaccine. The authors assume this is because Malaysia manages its own local vaccines, while Indonesia does the opposite.

Keywords: *Bibliometric Analysis; COVID-19 Vaccine; Research Trends*

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Introduction

The global dissemination of COVID-19 had detrimental effects on numerous nations across the globe. The disease had spread to 90 percent of the countries around the world three months after its appearance (Bhalla et al., 2020; Garrett, 2020). The propagation of a viral epidemic, discovered in Wuhan, Hubei Province, China, horrified the world at the time. The viral outbreak quickly spread to many countries after that. As part of a preventative plan against the spread of the disease to all countries and society, the World Health Organization (WHO) issued directives to stop the viral epidemic due to this momentous event (Sohrabi, Alsafi, O'Neill, Khan, Kerwan, Al-Jabir, Losifidis, & Agha, 2020; Jafar et al., 2022).

As of January 2020, 278 COVID-19 cases were recorded in China, two in Thailand, one in Japan, and one in Korea due to the viral outbreak's expansion. Hubei Province recorded 258 incidents, Guangdong Province reported 14, Beijing reported five, and Shanghai reported one (Hashim et al., 2021). Additionally, WHO said that on January 30, 2020, the disease that began in China would be highly hazardous to global society. The Public Health Emergency of International Concern (PHEIC) described the epidemic as threatening world health. Following the statement, WHO formally identified the 2019-nCoV-related viral epidemic of COVID-19 (Makmun & Hazhiyah, 2020).

In less than eight months since its appearance, nearly 10 million cases have been confirmed, and more than 500,000 deaths have been reported in 188 countries as of June 25, 2020 (Badr et al., 2020). A report from WHO confirmed that there were more than 106 million COVID-19 cases, with a total death rate of 2.3 million people (Bono et al., 2021). Based on a report from the Worldometer, the number of deaths due to COVID-19 has increased annually. At the end of 2020, the number of casualties would have reached 1.9 million. At the end of 2021, this number had increased drastically to 5.4 million; at the end of 2022, it was close to 6.7 million. As of January 7, 2023, 668 million COVID-19 cases were reported, with a death rate of 6.7 million worldwide.

The United States has the highest number of cases, followed by India, Brazil, Russia, and Peru (Shiferaw, 2021). Since the spread of the disease became a global public health emergency, various studies from several subject areas have been carried out regarding the COVID-19 vaccine to produce new discoveries. From year to year, the number of research publications has increased along with the number of cases and deaths. Many countries worldwide are fighting to slow the spread of the disease. As a first step, governments around the world are implementing non-pharmaceutical measures, including engineering controls, administrative controls, isolation, quarantine, social distancing and community containment, personal protective equipment, environmental hygiene, and ventilation (Kamga & Eickemeyer, 2021).

However, in an effort to reduce the spread of the disease, governments from several countries around the world have responded quickly to carry out various research programmes for the COVID-19 vaccine. Evidently, in less than a year, more than 300 vaccine candidates have been developed. About 80 vaccine candidates have conducted clinical trials, and 11 vaccines have received full approval or are even banned for use in

several countries, such as Canada, China, Russia, the UK, and the U.S. (Ferranna et al., 2021). As of May 28, 2020, 224 COVID-19 treatments and 145 COVID-19 vaccine research programmes are underway in some countries in sub-Saharan Africa (Folayan et al., 2021).

President Putin is also working on creating his own local vaccine in Russia. In August, he announced that the world's first vaccine, Sputnik V, had been approved and officially registered in Russia. Even their second vaccine was approved and announced in early October (King & Dudina, 2021). As of September 8, 2020, nine CEOs of pharmaceutical companies in the U.S. have pledged to develop and test potential vaccines for COVID-19 with high ethical standards and scientific principles (Bauchner et al., 2020). Finally, in mid-November 2020, Pfizer and Moderna succeeded in developing a COVID-19 vaccine that has high effectiveness. Pfizer is also licenced for use in the second week of December 2020 in several countries, including the UK, Bahrain, Canada, and the U.S. (Guidry et al., 2021). This vaccine is focused on people over 80 years old, people working or living in care homes, and healthcare workers who have a high level of risk (Lockyer et al., 2021).

Other Asian countries that have also been affected by the spread of the disease are Indonesia and Malaysia, two states in Southeast Asia with the largest Muslim populations. Through data searches from the Worldometer, the total population of Malaysia as of January 5, 2023, was only 33.4 million. Meanwhile, on the same date, Indonesia had a population of 280.7 million. The statistic shows that Indonesia has eight times more people than Malaysia; this places Indonesia in a very urgent position to carry out more serious research related to the research and development of the COVID-19 vaccine to overcome the limited stock of vaccine and also one of the efforts to reduce the spread of the disease without having to depend on other countries.

The increase in cases and death rates due to COVID-19 triggered a lot of research by researchers and scholars worldwide. They flock to do various kinds of research related to health, social sciences, engineering, and the environment. In a study conducted by a team of researchers at the Research and Development Centre for Religious Guidance and Services, the Research and Development and Training Agency, and the Ministry of Religion of the Republic of Indonesia, the research discussed things related to the enthusiasm of the Indonesian people, who are primarily Muslims, following their reasons for joining the vaccination programme (Puslitbang Bimas Agama dan Layanan Keagamaan, Badan Litbang dan Diklat, 2021).

Wagner et al. (2021) found that 26 percent of the total 1.493 respondents who took part in the interview had received the vaccine. Meanwhile, 57 percent of respondents are willing to get vaccinated, and 17 percent have no plans for a vaccine (Wagner et al., 2021). Based on other research, respondents with sufficient understanding of child vaccinations are more likely to believe that vaccinations are entirely safe and that children should have them (Sinuraya et al., 2022).

This study will examine how Indonesia and Malaysia responded to COVID-19 vaccine research trends from 2020 to 2022 by comparing a number of prior studies. Malaysia and Indonesia were also included since they are close by and have a large

Muslim population. Because we wish to assess the significance of the number of studies that have been carried out in both nations, the number of vaccine research studies is an important variable to track. We, therefore, chose to divide several classes by year, country, author, affiliation, and research funding support in order to evaluate the number of their studies using bibliometric analysis, which used data from Scopus to create new research from earlier studies.

Research Methods

This research is a type of literature study using a qualitative method (collection of data based on writings, books, article journals, and official websites). In a bibliometric study, data can be obtained from primary, secondary, or tertiary journals covering a certain period and analysed from various angles to determine The data displayed is in the form of documents based on the year of publication, country or regional affiliation, type, field of study, and source (Liang et al., 2022). In this study, the authors collected various kinds of data using the Scopus database to analyse scientific research related to COVID-19 vaccine research in Indonesia and Malaysia.

The design of this study began by collecting data from Scopus to observe how Indonesia and Malaysia respond to vaccine research trends related to the COVID-19 vaccine and which countries have more interest in the research. There are total of 935 documents about the COVID-19 vaccine in Indonesia and Malaysia from 2020 to 2022. Scopus is the primary source for analysing the research. As one of the largest database centres in the world, Scopus can index scientific literature to provide accurate information about analysing data from every research article, including publication data, abstracts, and references (Baas et al., 2020).

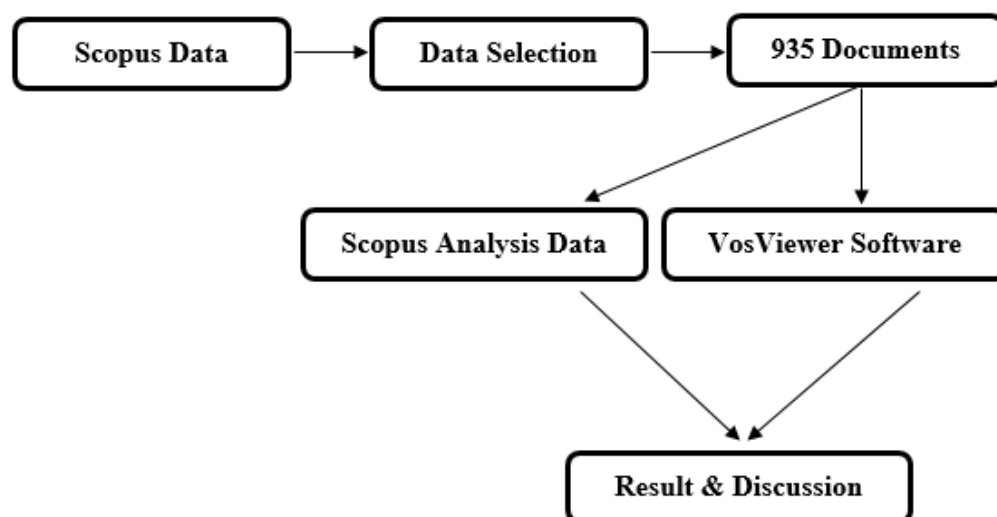


Figure 1. The Stages of Processing and Analysing Data Obtained by Scopus
Source: Processed by Authors (2023)

Figure 1 shows the process and analysis of the data generated from Scopus. Using the keyword "COVID-19 vaccine", data was obtained from as many as 935 documents in total. The data was analysed bibliometrically by year, country, author, affiliation, and research funding support. Data was also analysed using VosViewer to be able to distinguish visualisations of COVID-19 vaccine research trends in Indonesia and Malaysia. From the two analyses, the results were obtained and became the subject of discussion in this research.

VosViewer is a software application used for the construction and facilitation of visual representations of bibliometric networks. The VosViewer software facilitates the visualisation of comprehensive bibliometric maps, thereby enhancing their interpretability. The present study employed VosViewer as a tool for the purpose of mapping scientific publications pertaining to COVID-19 vaccine research and conducting an analysis of the visual representation of these publications. VosViewer places significant emphasis on the visual depiction of bibliometric maps (Husaeni & Nandiyanto, 2022).

Bibliometric analysis refers to a statistical approach that offers a quantitative understanding of scholarly literature (Benckendorff & Zehrer, 2013). Bibliometric studies provide valuable insights into the expansion of scholarly literature and the dissemination of knowledge within a specific discipline over a period of time. These studies involve the analysis of various data sources, such as citations, authorship patterns, keywords, and temporal information, which are typically obtained from databases (Leung et al., 2017). In recent research publications, it has experienced a significant surge in popularity. The popularity of bibliometric software, such as Gephi, Leximancer, and VosViewer, as well as scientific databases like Scopus and Web of Science, can be attributed to their advancements, increased availability, and enhanced accessibility. The prominence of bibliometric analysis in scholarly publications is not merely a passing trend but rather a manifestation of its efficacy in examining extensive scientific data and generating reliable research findings (Ellegaard & Wallin, 2015; Donthu et al., 2021).

The bibliometric analysis compares the contributions of students, journals, institutes, and countries and gives information on patterns in research activity over time. This analysis employs quantitative and qualitative methods to analyse publications, using the system and traits of literary metrology as research objects (Gao et al., 2017). Citations and co-citation analysis were used in the bibliometric study for the quantitative review. Quotes show that a student has used a specific piece of writing to illustrate its worth, significance, and effect. This analysis uses the most frequently cited works to understand the theoretical foundations, techniques, and keywords that support the study field (Wang et al., 2022). Researchers can acquire themes or clusters of nations, institutions, and keywords used in the titles and abstracts of published publications by correlating citations and entering bibliometrics. The affinity of specific terms, authors, journals, organisations, or nations in various research streams is reflected in these themes using a single colour (Shah et al., 2020).

Results and Discussion

Global Publication Analysis

The results of the analysis of 935 research publications based on the Scopus database obtained various kinds and variations of data. This research is related to COVID-19 vaccine research in Indonesia and Malaysia from 2020 to 2022. Research analysis and data classification start with the number of documents published per year, countries, authors, affiliations, and research funding support that have significantly contributed to research publications.

Document by Year

Research on the COVID-19 vaccine has become lively and increased significantly since its appearance in December 2019. Many studies have been conducted to produce discoveries related to the COVID-19 vaccine. The researchers use the advent of this crisis as material for research discussion to observe the social dynamics that have emerged in several countries. The figure below will show trends in research publications related to COVID-19 vaccine research from 2020 to 2022 in Indonesia and Malaysia.

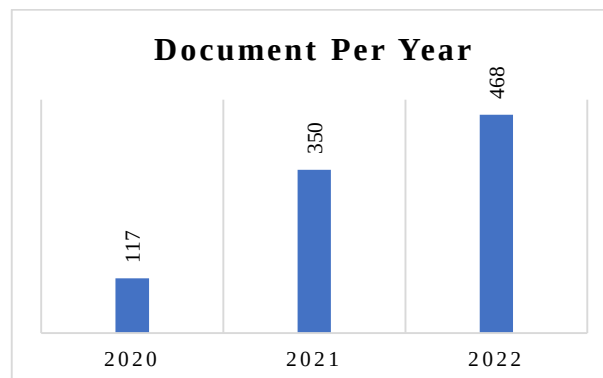


Figure 2. Document Per Year
Source: Scopus Database (2023)

Figure 2 illustrates the annual distribution of publications pertaining to the research on COVID-19 vaccines in Indonesia and Malaysia, spanning the years 2020 to 2022. The number of documents indexed in Scopus experienced a notable increase over the course of three consecutive years. Specifically, there were 117 documents indexed in 2020, followed by a rise to 350 documents in 2021 and a further substantial increase to 468 documents in 2022. Over the course of the past three years, it has been observed that the year 2022 has garnered the highest count of research publications within the Scopus index. Research publications across various subject areas are heavily focused on health and medicine. In the realm of social sciences, a total of 84 scholarly documents have been identified, focusing on the discourse surrounding the vaccine controversy and the general public's reaction to the COVID-19 vaccine.

Document by Country

The target nations for COVID-19 vaccine research from 2020 to 2022 are Indonesia and Malaysia. Which country contributed the most to the publication of this research? That information is shown in Figure 3.

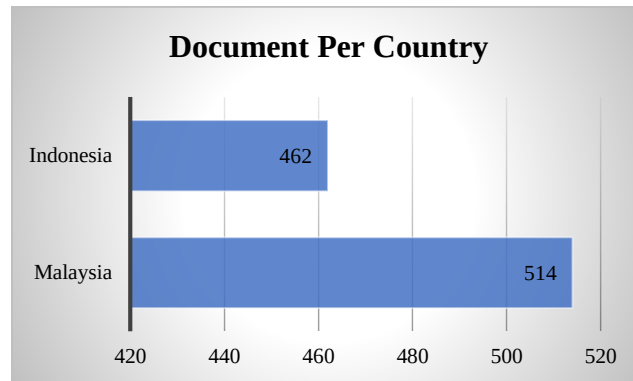


Figure 3. Document Per Country
Source: Scopus Database (2023)

Figure 3 shows Malaysia has contributed the most to publications with the Scopus index related to COVID-19 vaccine research from 2020 to 2022. Even though Malaysia and Indonesia are not included in the top ten countries that contribute to the publication, total publications from these two countries reach more than 900 documents from several subject areas. A total of 514 documents were published by Malaysia and 462 documents by Indonesia.

Document by Author

Scientific research using the Scopus database related to COVID-19 vaccine research from 2020 to 2022 in Indonesia and Malaysia has produced 935 publications. Figure 4 portrays ten authors who significantly contributed to the research.

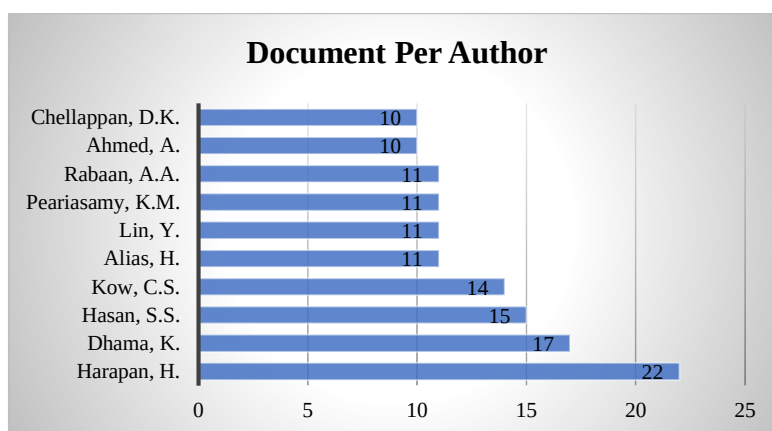


Figure 4. Document Per Author
Source: Scopus Database (2023)

Figure 4 shows that from 2020 to 2022, Harapan Harapan was the author who made the largest contribution to publications relating to COVID-19 vaccination research in Indonesia and Malaysia. Khuldeep Dhama has 17 documents, whereas Harapan Harapan has 22 documents. Syed Shahzad Hasan and Chia Siang Kow each have 15 and 14 papers, respectively. Additionally, Ali Ahmed and Dinesh Kumar Chellapan each had ten documents. Whereas Haridah Alias, Yulan Lin, Peariasamy, K.M., and Ali A. Rabaan each had eleven documents.

Five Malaysian researchers dominate the top ten authors of publications. Others came from Indonesia, India, the United Kingdom, China, and Saudi Arabia. These Malaysian authors include Chia Siang Kow from International Medical University (IMU-Kuala Lumpur, Malaysia) with a total of 14 publication documents; Haridah Alias from the University of Malaya (Kuala Lumpur, Malaysia) with 11 documents; Peariasamy, K.M., from the Ministry of Health Malaysia (Kementrian Kasihatan Malaysia) with 11 documents; Ali Ahmed from Monash University (Selangor, Malaysia) with ten documents; and Dinesh Kumar Chellapan from International Medical University (IMU-Kuala Lumpur, Malaysia) with ten related documents.

The author from Indonesia has Harapan Harapan from Syiah Kuala University (Banda Aceh, Indonesia) with the highest number of research publications related to COVID-19 vaccine research from 2020 to 2022, with 22 documents. From India, there is Khuldeep Dhama from the Indian Veterinary Research Institute (ICAR-India) with 17 documents. Furthermore, Syed Shahzad Hasan from the University of Huddersfield, UK, has 15 documents. Then, from China, there is Yulan Lin representing Fujian Medical University (Fuzhou, China) with 11 documents. Finally, Ali A. Rabaan from Alfaisal University (Riyadh, Saudi Arabia), with 11 documents. Totally, Malaysia has the most significant number than Indonesia. From the number of publications, 56 documents were successfully published by Malaysian researchers, while Indonesian researchers successfully published 22 documents.

Document by Affiliation

From 2020 to 2022, apart from the authors, several institutions have also contributed to the publication related to COVID-19 vaccine research in Indonesia and Malaysia. Figure 5 shows the top five affiliations of several Indonesian and Malaysian institutions that have significantly contributed to the research publication.

Figure 5 shows that Universiti Sains Malaysia has the highest contribution to research publications with a total of 75 Scopus-indexed documents, followed by the University of Indonesia with 63 documents, Universiti Malaya, and Monash University Malaysia with 62 and 61 documents, respectively. The last, Universitas Airlangga, contributed 54 documents.

The higher level of research publication by authors from Malaysia than Indonesia is also accompanied by the high level of publication by affiliation in the two countries. Three universities in Malaysia dominate publications related to COVID-19 vaccine research in Indonesia and Malaysia from 2020 to 2022. The affiliation with the highest publication of

research documents is Universiti Sains Malaysia, with 75 research documents. The university is ranked 143 in the world based on the results of disbursements through the University Rank. Furthermore, the University of Malaya, with a world ranking of 70, published 62 research documents, and Monash University (the university's order does not appear in the University Rank search) published 61 documents.

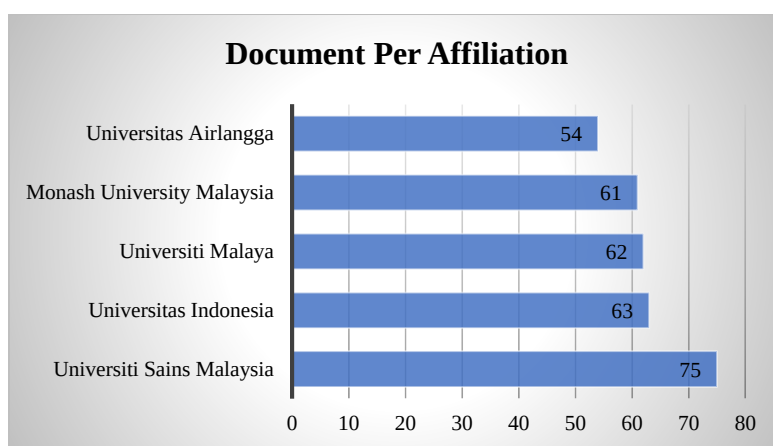


Figure 5. Document Per Affiliation
Source: Scopus Database (2023)

In Indonesia, affiliations with the most publications are made by universities with a world ranking of 248, namely the University of Indonesia, with a total of 63 publications. Meanwhile, Universitas Airlangga, ranked 369th worldwide, published 54 documents. Overall, educational institutions in Malaysia dominate research publications, with three universities contributing a total of 198 documents and two educational institutions in Indonesia contributing 117 documents. This figure is still lower than the number of research publications conducted by educational institutions in Malaysia. In addition, publications of research documents related to COVID-19 vaccine research in Indonesia and Malaysia from 2020 to 2022 were also carried out by the best universities in Malaysia with the top 150 rankings worldwide.

Document by Research Funding Support

To produce new discoveries beneficial to many parties, several institutions have also provided financial support for publications related to COVID-19 vaccine research in Indonesia and Malaysia from 2020 to 2022. Figure 6 shows several institutions from Indonesia and Malaysia that have significantly contributed to providing financial support for research publications.

Figure 6 demonstrates the important role the Malaysian Ministry of Higher Education played in the publication of 20 research papers that were Scopus-indexed. Kementerian Kesehatan Malaysia, Universitas Padjadjaran, and Universiti Sains Malaysia came next with 13, 11, and 16 documents, respectively. Ten documents were also submitted by Universitas Airlangga. 49 publications in total have received funding from Malaysian institutions to support their research. In the meantime, institutions in

Indonesia provided monetary support for 21 documents. Overall, bibliometric analysis shows that Malaysia is far superior to Indonesia in all the classifications analysed.

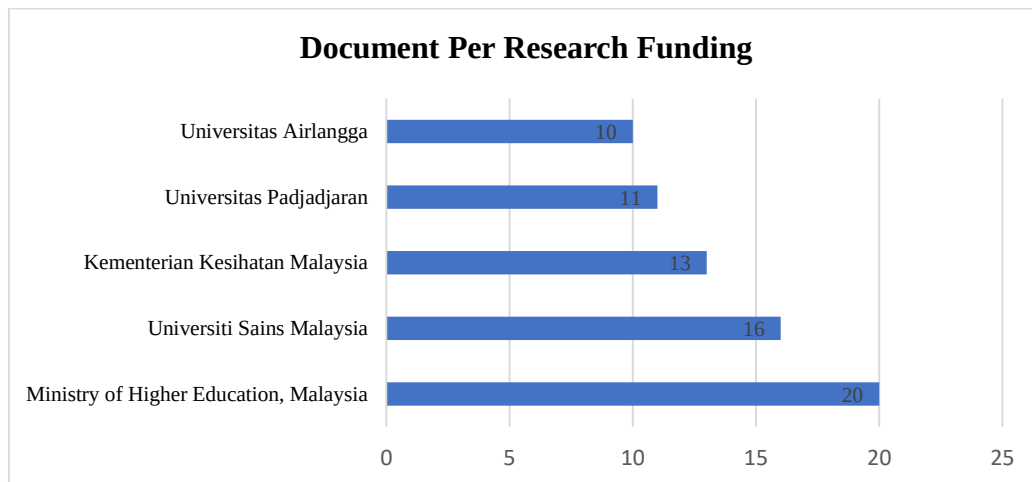


Figure 6. Document Per Research Funding
Source: Scopus Database (2023)

Mapping the Visualisation Network of COVID-19 Vaccine Research Publications

In mapping the scientific research publication network related to COVID-19 vaccine research in Indonesia and Malaysia from 2020 to 2022, the authors used the VosViewer software to view publications on COVID-19 vaccine research from previous studies. VosViewer is software for building and visualising bibliometric networks. These networks can include individual journals, researchers, or publications, and they can be built through citations, bibliographical amalgamations, shared citations, or author relationships (Hamidah, Sriyono, & Hudha, 2020).

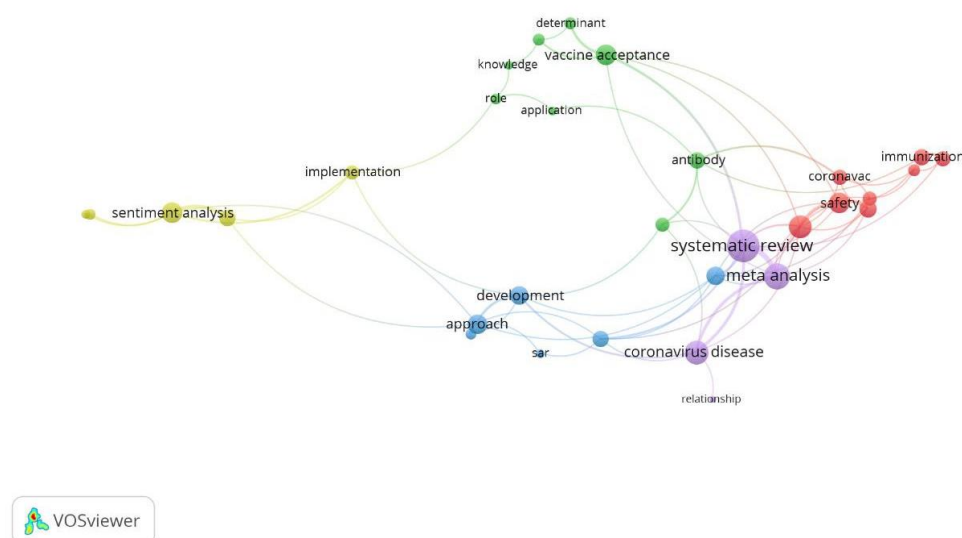


Figure 7. Visualisation of COVID-19 Vaccine Research Trends in Indonesia
Source: Analysis Using Vosviewer (2023)

Figure 7 shows the visualisation of the COVID-19 vaccine research trend in Indonesia. Cluster one is in Purple. The main topic in the visualisation of the COVID-19 vaccine research trend in Malaysia is coronavirus disease. Coronavirus disease development and the implementation of safety measures until Indonesian citizens accept vaccines are significant topics of research in Indonesia. The second cluster is in Red. Few keywords such as 'safety,' 'CoronaVac,' and 'immunization' are shown. The research on corona vaccine and its relations to antibodies had been done by Indonesian researchers. Moreover, the government's safety measures and approach during the outbreak have become one of the most crucial topics in this field. The third cluster is shown in blue. From the third cluster, we can see that there is a connection between 'development,' 'antibody,' 'CoronaVac,' and 'immunization.' This shows that researchers in Indonesia actively conduct research on vaccine development for Indonesian citizens. Cluster four in the figure above is shown in green. This cluster is mainly about Indonesia's acceptance of the coronavirus vaccine. The research covers the determinants that decisively affect the Indonesian perception of vaccine acceptance.

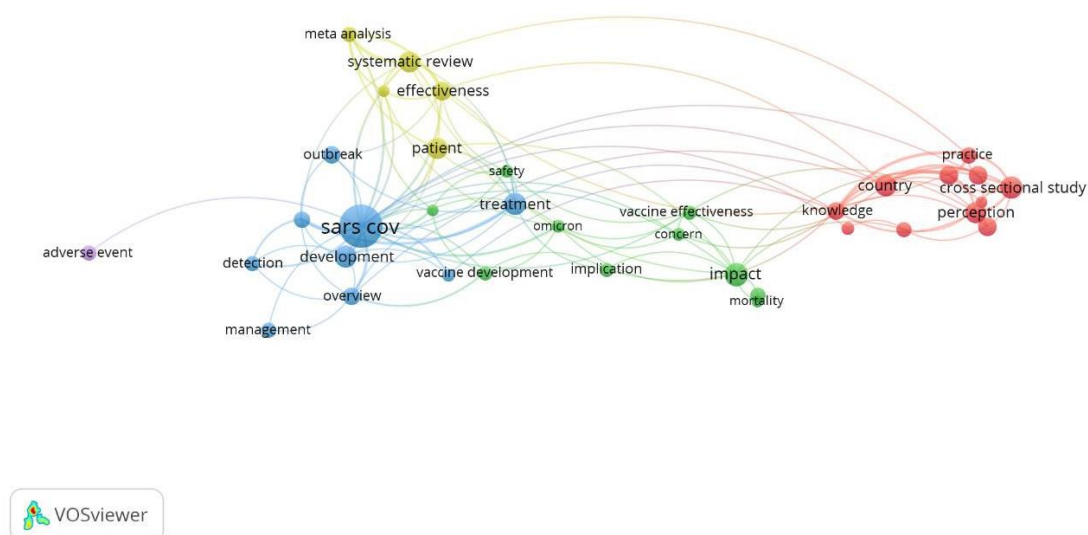


Figure 8. Visualisation of COVID-19 Vaccine Research Trends in Malaysia
Source: Analysis Using Vosviewer (2023)

Figure 8 shows the visualisation of the COVID-19 vaccine research trend in Malaysia. Cluster one is blue, which includes general topics with COVID-19, including the outbreak, treatment, and management. Malaysia has undergone little research on Sars covid treatment and its management. The second Cluster is red. The figure above shows that the second cluster is mostly about knowledge, perception, and practise during the outbreak. There is a connection between 'sars covid' and 'practice'. This means that there are several studies on how the standard operating procedure (SOP) was introduced by the government of Malaysia during the outbreak. Cluster three in the figure above is in Green. The third cluster showed a few crucial keywords, which are 'vaccine effectiveness,' 'concern,' 'implication,' 'impact,' and 'mortality.' The development of vaccines in Malaysia

has become one of the main topics of research in this field. There is some research on the effectiveness of vaccines to curb the spread of the COVID-19. Besides, research on the vaccine's impact, which is related to the mortality rate in Malaysia, has become a topic of interest for a few researchers. The last Cluster is yellow. From the fourth cluster, we can identify that there is research on vaccine effectiveness for COVID-19 patience and the impact on the country's COVID-19 patience.

As the first country where COVID-19 appeared, China's bad image is unavoidable in the international community. It made China try hard to be responsible for the problems caused by its country. China has started to take the initiative to send medical aid to several countries in need. Masks and protective clothing have also begun to be sent to Europe, America, and other countries. This is where the term of mask diplomacy appears.

Having succeeded in sending masks and medical supplies, China then conducted the Sinovac vaccine in several countries, such as Brazil, Indonesia, and Turkey, in early 2021. Apart from distributing them for free, China also sold the vaccines to Asia, Africa, Latin America, the Middle East, and Eastern Europe with payments and loans. As of April 2021, China had successfully delivered vaccines to more than eighty countries. Twenty-seven countries with middle and upper economic levels are required to pay for the vaccine, while fifty-three countries receive free vaccine assistance. This moment is also known as the Vaccine Diplomacy globally (Cipto, 2022).

The term "global health diplomacy" was introduced by the World Health Organization (WHO) as a means of fostering international cooperation in addressing public health crises, enhancing healthcare systems, and revitalising multilateral organisations (Javed & Chattu, 2020). The term science diplomacy also appeared with the aim of increasing opportunities for the development of global health dynamics, health security, justice, and health equity (AlKhaldi et al., 2021). This vaccine is then used as a new economic and geopolitical opportunity for China, including its involvement in health diplomacy (Lee, 2023) after COVID-19 presented a brutal choice between economic and public health (Azoulay & Jones, 2020). As the International Monetary Fund (IMF) predicts, COVID-19 will have a more extreme impact than the 2008-2009 financial crisis (Balmford et al., 2020) because it attacks many sectors of oil, tourism, aviation, business volume, interest rates, market instability, and demand and supply ratio aspects (Narasimha et al., 2021).

In Malaysia, the first case of COVID-19 was detected on January 25, 2020. Then, on February 5, 2021, it reported more than 261 thousand cases with 958 deaths. Therefore, the Malaysian government has provided up to RM3 billion in funds to import vaccines. The government also has to use fiscal policy to provide a stimulus of RM250 billion to protect its people from economic, business, and social impacts (Shaari et al., 2021; Hamdan et al., 2022). Meanwhile, in Indonesia, the first case of COVID-19 was identified on March 2, 2020, and there were 134 confirmed cases in eight provinces, including Bali, Banten, DKI Jakarta, West Java, Central Java, West Kalimantan, North Sulawesi, and Yogyakarta (Fadli et al., 2020; Tinungki et al., 2022).

This situation has caused the vaccine development project to accelerate. Governments from several countries, notably Indonesia and Malaysia, have made it a

policy to implement vaccination programmes for their citizens to slow the spread of the disease throughout the international community. The Indonesian government chose to import seven vaccines from Japan, China, the U.S., the UK, and Spain. Vaccines are additionally imported into Malaysia from the U.S. and the UK. The Pfizer vaccine arrived in Malaysia on February 21, 2021, while the AstraZeneca vaccine arrived on April 23, 2021. What the two nations did was strengthen the immune systems of their citizens. Nearly 200 million Indonesians between the ages of 18 and 60 have received vaccines due to a 15-month vaccine programme launched by the Indonesian government. Following the Minister of Health's choice, the Indonesian government chooses vaccines deemed safe for its citizens (Widjaja et al., 2021).

This was proven through a global survey conducted in Malaysia, where 93 percent of the people received the COVID-19 vaccine (Marzo et al., 2022). It was reported that the AstraZeneca vaccine (AZD1222) was 74 percent effective against the symptoms of COVID-19. For Pfizer-BioNTech (BNT162b2), it has an efficacy rate of 91.3 percent within six months. Meanwhile, the efficacy of the Sinovac vaccine (CoronaVac) is estimated to vary. Through three phases of trials in Turkey, the efficacy rate was 83.5 percent. In Brazil, the efficacy rate of this vaccine is 50.4 percent, and in Indonesia, it is 65 percent (Suah et al., 2021). The uncertainty about the vaccine's efficacy, such as low and low responses from different countries, will definitely become a challenge (Tan & Liew, 2023). The vaccination programme is considered an effective way to suppress and control the spread of the disease. However, its effectiveness depends on the willingness of the people to get vaccinated, and this programme will be successful if it gets a positive response from the community (Arifin & Anas, 2021; Alwi et al., 2021).

Therefore, to increase awareness and positive response to the vaccine, the public must be given knowledge of its efficacy, protection, and halal status to increase its acceptance in society, especially among Muslims. People's responses to vaccination programmes vary, including positively, negatively, or even neutrally. Socio-demographic characteristics, the experience of being infected with COVID-19, religious belief, and support indicate the vaccine process. Behaviour towards the COVID-19 vaccine and excessive speculation in religion influence a person's response to the vaccine programme. Many efforts involving all stakeholders, including medical experts and religious leaders, are urgently needed to realise this programme (Dzulkhairi et al., 2022).

The virus outbreak affected Malaysia and Indonesia. On April 3, 2020, Malaysia was reported to have the highest infection rate in Southeast Asia, with 3.116 cases and a death rate of 50 people. Malaysia and Indonesia are frequently chosen as venues for Islamic religious events. The high number of COVID-19 cases was related to tabligh, or religious gatherings. The huge population of Muslim communities in Indonesia and Malaysia then becomes a challenge for the vaccine to be accepted in Muslim society. Moreover, the rejection of vaccines is also related to Muslims with conservative views. This is influenced by hesitancy about the halal status of the vaccine and belief in God as the only "substance" capable of controlling one's health and illness (Wong et al., 2022).

Even at the beginning of the crisis, WHO also stated that the acceleration of the spread of COVID-19 was accompanied by a "Massive Infodemic", in which a lot of

information, whether accurate or not, has made it difficult for people to find reliable sources and guidance (Mukhtar et al., 2020). That's why rumours and conspiracy theories may lead to mistrust, contributing to vaccine hesitancy (Islam et al., 2021). There is a lot of controversy among the public regarding the COVID-19 vaccine. Hesitancy, efficacy, side effects, and even religious belief have caused many people to be reluctant to take vaccines. What's more, an online survey conducted in the U.S. in April 2020 showed that 33 percent of 845 adults believed there was a conspiracy related to COVID-19 (Earnshaw et al., 2020).

As a percentage, only 50 percent of individuals in the U.S. are willing to receive the COVID-19 vaccine, whereas 60 percent of people in France will receive the vaccine, and in the UK or Denmark, around 80 percent (Antonakis, 2021). In Japan, 65.7 percent of the respondents were willing to get the vaccine, especially among the older groups in rural areas (Yoda & Katsuyama, 2021). In addition, former President of Brazil Jair Bolsonaro also questioned the efficacy of the COVID-19 vaccine and publicly stated his rejection of the vaccine offered to him (Daniels, 2021). In fact, an online cross-sectional survey conducted by Healthcare Workers (HCW) of 1,723 respondents reported that 67 percent (1,155 respondents) intended to be vaccinated, while 26 percent (443 respondents) were unsure, and 7 percent (125 respondents) stated their refusal (Gennaro et al., 2021).

When the article entitled COVID-19: Malaysia's fight against this deadly virus was published on June 2, 2021, Malaysia was confirmed to still face 500,000 cases of COVID-19, with 2,300 deaths. It made Malaysia the country with the third-highest number of COVID-19 cases in the Southeast Asian region after Indonesia and the Philippines. However, a study completed in 2020 reported that 55 percent of the respondents responded positively to getting vaccinated, while another 45 percent were still unsure (Loo & Letchumanan, 2021). Moreover, as of May 13, 2021, 17.60 million people in India had been vaccinated, with a total of 9.9 percent of the population (13.78 million people) getting dose I and 2.74 percent (3.82 million people) getting dose II (Singh, 2021; Choudhary et al., 2021).

To effectively deliver three billion doses of the COVID-19 vaccine by mid-2021, many medical researchers are vying to develop a safe and effective COVID-19 vaccine (Ndwandwe & Wiysonge, 2021). Despite having a larger population than Malaysia, Indonesia has an inverse relationship with total research publications. To overcome the limited supply by foreign biopharmaceutical businesses, this state urgently needs to do a more thorough study in relation to the creation of the COVID-19 vaccine. Indonesia has succeeded in developing its own local vaccine, known as "IndoVac", despite having fewer scientific publications than Malaysia. Since November 2021, the state-owned pharmaceutical business Bio Farma has been working on the vaccine in conjunction with Texas' Baylor College of Medicine. The vaccine was then authorised for use in adults in an emergency in September 2022 (Strangio, 2022).

Unlike Malaysia, which has a population eight times smaller than Indonesia's, Indonesia takes the development of the COVID-19 vaccine very seriously. Unfortunately, the local vaccination for this state is still being developed and won't be usable until 2024. The Institute for Medical Research (IMR), which is overseen by the Malaysian Ministry of

Health, is collaborating with Universiti Putra Malaysia and the Veterinary Research Institute to create a vaccine as a kind of state preparation for dealing with cases that might spread in the future (Star, 2021). It shows a significant knowledge gap between Malaysia and Indonesia. This result also demonstrates Indonesia's continued anxiety and dread towards the generation of new information.

This is even more interesting because, with the high publication rate of research related to the COVID-19 vaccine, Malaysia is even slower in creating its vaccine. As we all know, Indonesia collaborates with Baylor College of Medicine in Texas, U.S., to develop its local vaccine. So it is not surprising that, with a low level of interest in research publications, Indonesia has succeeded in creating its own vaccine. It differs from Malaysia, which does not collaborate with foreign institutions to develop its local vaccine. Malaysia is only known to have collaborated with local institutions in developing vaccines, so it is not surprising that Malaysia's local vaccine will be ready for use two years later.

Conclusion

Over the past few years, the spread of COVID-19 has captured the attention of many states, including Indonesia and Malaysia. The governments of the states are making every effort to protect the stability and security of their countries from any negative effects that may occur. The focus is on conducting research across a range of disciplines to make new discoveries that can be applied to address issues in the medical, social, psychological, and economic fields. Based on state classification, authors, affiliations, and research funding support, the findings of bibliometric analysis reveal that Malaysia has paid more attention than Indonesia to the trend of COVID-19 vaccine research throughout the period of 2020 to 2022. Despite the extensive study articles produced by Malaysian scholars, Indonesia's accomplishment in developing the domestic vaccine known as "IndoVac" truly demonstrated the true results. Malaysia will face a new challenge in the future: producing new discoveries that are more real and scientifically supported. The study suggests that Malaysia collaborate with foreign institutions to develop its own vaccines in order to hasten the production process, much like Indonesia did with one of the U.S. medical colleges. Even if the findings of the publication suggest that Indonesia is actually behind Malaysia, the study also advises undertaking additional research on the reasons why local vaccine development in Malaysia is slower than in Indonesia. With that, new and improved analyses will be discovered, particularly to update the findings of earlier research.

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