

# Covid-19 Pandemic and Exit Policy Strategy: A Cluster Analysis using R

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This bibliometric research investigates trends from various studies on exit policy strategies through economic policies in multiple countries during the COVID-19 pandemic in the scientific literature published by the Scopus-indexed journal. The data analyzed were 740 research publications discussing exit policy during the COVID-19 period. The search determined research datasets in the publishing range from 2019 to 2021. The data is then analyzed using the R application program to determine the bibliometric mapping of exit policy research developments during the COVID-19 pandemic. The results show that in the visualization of the mapping of research developments on this theme, the keywords that appear the most are Fiscal Policy, Macroeconomics, Monetary Policy, Economic Recovery and Gross Domestic Product. Based on the cluster analysis, it can be concluded that there are at least four research lines, namely: (1) exit policy on fiscal; (2) exit policy and public health; (3) exit policy on monetary policy; and (4) exit policy and SMEs. This study also provides information about exit policies on economic policies implemented in various countries in the face of the COVID-19 pandemic.

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## INTRODUCTION

The negative impacts of the COVID-19 pandemic are rapidly spreading around the world, not only due to the contagious nature of the virus, but also due to the mobility of the world's population and highly connected global value chains. In most developing countries, the increased caseload of the COVID-19 pandemic resulted in the withdrawal of some macroeconomic support. Following the economic contraction caused by the COVID-19 pandemic in 2020, global economic activity gained momentum for improvement, but is still well below pre-pandemic projections. In addition, the recovery has been uneven, with many poor countries still unable to overcome the pandemic, and many economic uncertainties ahead (The World Bank, 2022).

The challenges surrounding a robust and equitable recovery strategy from COVID-19 have evolved substantially over the past year or so. In addition to affecting the direction of existing and anticipated monetary and fiscal policies, dramatic changes in the economic environment and high levels of uncertainty have also had a significant impact on the direction of policy. Before the economic shock created by the invasion, regulators began to normalize their fiscal and monetary policy settings (Maffettone, 2020). In many countries, the use of programs to assist the economy and the functioning of financial markets has also been reduced, with facilities being removed or redirected to more specialized initiatives. In addition, some countries started to modify their prudential measures.

Output losses are greatest for countries dependent on tourism and commodity exports and for those with limited policy space to respond. Many of these countries entered the crisis in a precarious fiscal situation and with less capacity to scale up health care policy responses or support livelihoods, so income inequality is likely to increase significantly due to the pandemic, with nearly 95 million more people estimated to have fallen below the extreme poverty threshold in 2020 (International Monetary Fund, 2021).

This makes it difficult for policymakers to achieve a strong, egalitarian and inclusive recovery (Leach et al., 2021). Now, as policy space is constrained and firms and people have reduced financial buffers, COVID-19-related vulnerabilities may materialize. Moreover, the uneven global recovery increases the likelihood of negative spillovers (Mobin, 2022). And vulnerabilities that support mechanisms to prevent COVID-19 may now materialize. Collectively, these

setbacks may suggest that the scarring effects of the pandemic have greater potential to impede future growth.

Long-term prevention of scarring effects on sustainable growth requires strong domestic policies (Evgeniou et al., 2022). For authorities to ensure effective and targeted policy responses and exit strategies, close cooperation and information exchange are becoming increasingly important. Current constraints highlight the importance of ensuring that the policy mix adapts to economic circumstances, providing the necessary tools and incentives while remaining financially viable (Bisceglia et al., 2022). (Bisceglia et al., 2021). In a rapidly changing economic and financial environment, this requires continuous evaluation of the effects, interactions and trade-offs of policies affecting the financial sector. Moreover, decision-making should be informed by deeper knowledge of the buildup of hidden leverage in financial markets. In addition, authorities should investigate whether and how support measures can be made more targeted.

By paying attention to the real conditions and predictions of economic and monetary growth stagnation that will be faced by Indonesia as a result of the COVID-19 pandemic, it is interesting to examine how the country's readiness to face and anticipate the global financial crisis through the perspective of national fiscal policy with the tax function as an instrument that has flexibility for sustainable state revenue (budgetair), with a combination of regulating functions (regulerend) and economic stability to maintain conditions of contraction and relaxation of the national economy, if there is unbalanced turmoil even if it tends to become unhealthy (Adiyanta, 2020).

This research aims to analyze economic policy as an exit policy strategy used by countries in the world, especially during and after Covid-19, and provide an overview of the current status of scientific literature published in various Scopus indexed global journals. To achieve these objectives, this research focuses on describing relevant indicators to understand the production and influence of research, such as authors, institutions and countries. Furthermore, it visualizes the co-authorship and co-occurrence networks of keywords and analyzes research trends. These research trends can serve as a reference for experts and researchers especially in Indonesia as the country of recommendation to explore new directions for future research and find new innovations in enacting policies.

## LITERATURE REVIEW

Recent developments have emphasized the importance of ensuring that policy strategies evolve with the state of the economy, providing the right tools and incentives as needed, while remaining financially sustainable. This is an attempt to target actions appropriately. Furthermore, taking strategic policy direction to manage potential is a matter of concern. The [Financial Stability Board's \(2021\)](#) report on extending, modifying, and ending COVID-19 policy support emphasizes the need to manage the trade-off between withdrawing measures too early, which could adversely affect growth, and withdrawing policy support too late, which could contribute to vulnerabilities in the economy.

The basic prerequisite for designing such policies is to carefully assess whether adjustments to the expiration of support measures are compatible with the economic outlook ([Kubota, 2021](#)). Therefore, authorities should carefully monitor economic conditions and assess whether developments change the assessment of the impact of policy measures in place significantly. Given the recent experience of other large exogenous shocks, authorities may also carefully consider the potential costs to medium-term resilience associated with delaying the exit from policy measures.

Financial markets play a particularly important role for assessing the effects of policy adjustments in the current uncertain environment. A wide range of market-based indicators can help measure financial market participants' assessment of the economy and current conditions to inform decisions about changes in financial policy settings ([Muzi et al., 2022](#)). Ensure transparency and information that can be used by market participants to assess the viability of the company ([Mobin, 2022](#)).

Evolving economic conditions may affect the way different support measures interact and the potential trade-offs authorities face in employing them. In the current period of high economic uncertainty and rising inflation, asset prices may fall amid ample liquidity provision. Recent pressures in commodity markets have also focused attention on new channels of interaction. Increased financial participation may have increased the correlation between commodities and other assets, which can propagate volatility events ([Anderson et al., 2020](#)).

COVID-19 policies are influenced by various factors, depending on the country's level of development. They can provide better assistance and conduct more in-depth studies in richer countries with appropriate funding. Lockdown is the most frequently

used strategy in developing countries, with the exception of Vietnam and some unique districts in India. ([Behera et al., 2021](#)). The imposed shutdown then affects supply chain operations and market transactions ([Barneveld et al., 2020](#)).

The level of pandemic uncertainty is relatively high in developing countries, due to the significant correlation of the pandemic with market volatility and economic instability. Several measures have been attempted to contain the transmission of COVID-19 during this worldwide pandemic period. These containment methods include quarantine, travel bans and restrictions, social isolation, and lockdowns, including closure of public spaces and cancellation of public events. Preventive efforts have been detrimental to economic progress that seeks to mitigate the health consequences of the worldwide pandemic ([Sarkodie & Owusu, 2021](#)). In addition, recovery has been uneven, many poor countries may still escape the pandemic, and the future economy faces many uncertainties ([World Bank, 2021](#)).

A resilient global financial system is a necessary precondition to face these new challenges. At the same time, averting COVID-related financial stability impacts and effectively preventing scarring effects on long-term sustainable growth require effective domestic policies containing cross-border spillovers to address debt accumulation issues. Close cooperation and information exchange are becoming more important for authorities in ensuring tailored policy responses and appropriate exit policies ([Gollier, 2020](#)).

National government policies for dealing with emergencies vary widely between countries. Lockdown policies have sparked disagreement among experts, with stakeholders and policymakers opposing them as they result in high economic prices, accompanied by the halt of some productive activities. While the WHO (World Health Organization) has emphasized the critical nature of such measures in reducing the likelihood of transmission, the emerging arguments are influenced by the detrimental impact on national economies ([Alfano & Ercolano, 2020](#)).

The impact of COVID-19, which has caused considerable losses to the country's economy, has resulted in various actions taken by various countries, each of which has a consequent level of effectiveness in dealing with the COVID-19 pandemic. Other countries are still grappling with the COVID-19 pandemic, while some have effectively emerged from the crisis and are moving forward with their economic recovery. This research aims to compile a wide range of scientific

literature that examines policies adopted within a country's scope and tracks the development of trends to make recommendations. Furthermore, based on the research literature data, it is determined which policies are most widely adopted and can be a model for policy-making in Indonesia.

## METHOD

This study uses paper publication data sourced from various journals starting from 2019-2021 with research on the theme of COVID-19 and exit policy. Data collection was carried out through a search for articles indexed in the Google Scholar database, the search was carried out by typing the keywords 'COVID-19 and exit policy', then selected papers that were relevant to the research theme COVID-19 and exit policy, for journal criteria that were filtered and processed in software indexed by Scopus. From the search results, there were 740 articles published from 2019-2021. Data in the form of topics used in the

publication of papers on the theme of COVID-19 and exit policy and analyzed using Microsoft Excel 2010. The development trend of publications on the themes of COVID-19 and exit policy was analyzed using R software Biblioshiny (Puspita & Devi, 2023; Gunawan & Rusydiana, 2022).

To create a research mapping related to economic policy (exit policy) during covid-19, this study uses cluster analysis with the *Multidimensional Scaling* (MDS) and *Multiple Correspondence Analysis* (MCA) statistical approaches. Multidimensional scaling analysis is a multiple variable technique that can be used to determine the position of an object based on its similarity assessment (Saeed et al., 2018; Hout et al., 2013). MDS is used to determine the interdependence relationship between variables or data. MDS is divided into metric scaled MDS and non-metric scaled MDS. The following is a statistical equation for MDS cluster analysis with a Standardized Residual Sum of Square (STRESS) function as follows:

$$Stress = \sqrt{\frac{\sum_{r,t} (d_{rt} - \hat{d}_{rt})^2}{\sum_{r,t} d_{rt}^2}}$$

Meanwhile, *Multiple Correspondence Analysis* (MCA) is a statistical analysis that can be used when involving more than 2 qualitative variables in each individual that can be arranged in a multidirectional contingency table (Kamalja & Khangar, 2017). Correspondence analysis is one part of multivariate interdependence statistical analysis which has a long history as a categorical data analysis method. It was originally started in the mid-1930s and continues to be developed. Multiple Correspondence Analysis can help in uncovering patterns, associations, and dependencies between

categorical variables in a dataset, providing valuable insights for further analysis and interpretation.

The X indicator matrix is composed of elements 0 and 1, where 1 represents that a unit is included in a category and 0 does not indicate that it has a characteristic. Based on the indicator matrix, a *Burt matrix* can then be compiled which is the result of cross tabulation of the combined indicator matrix so that the rows and columns of all original variables can be analyzed. The following is the statistical equation for MCA cluster analysis.

$$\mathbf{B} = \mathbf{X}^T \mathbf{X} \quad (2)$$

$$\mathbf{B} = \{b_{ij}\} = \begin{bmatrix} X_1^T X_1 & X_1^T X_2 & K & X_1^T X_p \\ X_2^T X_1 & X_2^T X_2 & K & X_2^T X_p \\ M & M & O & M \\ X_p^T X_1 & X_p^T X_2 & K & X_p^T X_p \end{bmatrix}$$

Furthermore, the correspondence matrix is formed by dividing the Burt matrix by the total number

of element values so that the correspondence matrix has a certain formula.

## RESULTS

The following is a table showing the collection of documents used in research on the theme of COVID-19 and exit policy. Of the total 740 documents used, they

are divided into 4 types of documents, including journal articles (675 documents), anthologies/book *chapters* (26 documents), Conference Paper (9 documents) and Review (30 documents).

Table 1: Document Types

No.	Document Type	Number of Articles
1	Journal article	675
2	Book chapter	26
3	Conference paper	9
4	Reviews	30
	<b>Total</b>	740

Based on the results of the document type grouping above, the type of document most widely used as a research subject with the theme of COVID-19 and exit policy is a document in the form of a Journal article with a percentage of 91.21% or as many as 675 documents. Meanwhile, the least used document is in the form of a Conference Paper of 1.21% or 9 documents. This shows that the references used are quite valid because most of them come from documents in the form of scientific journals.

Various monetary policies were designed to respond to the economic conditions of various countries facing recession, where global economic growth has also declined as the COVID-19 pandemic has accelerated the

severe economic downturn. Monetary easing policies, including low interest rates and quantitative easing, were implemented to expand central bank balance sheets. Negative, accurate interest rates and quantitative easing again boosted asset prices which eventually exploded in 2020 during the pandemic (Helm, 2020). Government balance sheets and current financial conditions may limit expansionary policies in some emerging economies. Careful use of unconventional monetary policy and other non-fiscal policies can guide expectations and help restore confidence (Hepburn et al., 2020).

### Cluster Analysis

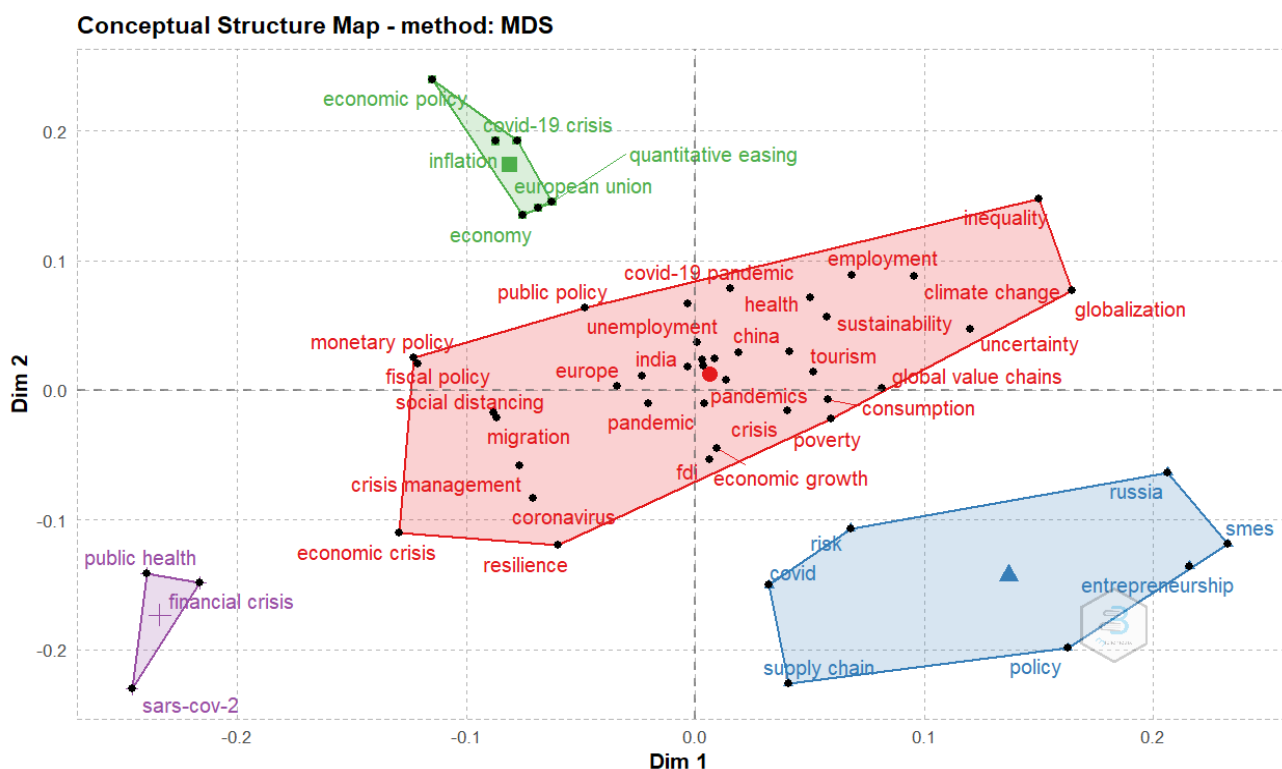


Figure 1. Multidimensional Scaling (MDS)-based Cluster Analysis

This study also describes the conceptual structure map of each word or contextual structure map that often appears in COVID-19 and exit policy themed research studies by dividing them based on mapping the relationship between one word and another through regional mapping. This cluster analysis is based on the *Multidimensional Scaling (MDS)* approach. Each word is placed according to the Dim 1 and Dim 2 values to produce a mapping between words that does not have

many different values. Dim itself stands for Diminutive Particle which is an assessment term in bibliometric mapping.

In this data, there are four areas divided into green area, red area, blue area, and purple area, where each area contains words that are related to each other. Based on the image above, the red area shows a greater variety of words included. This indicates that many studies link the words listed in this area.

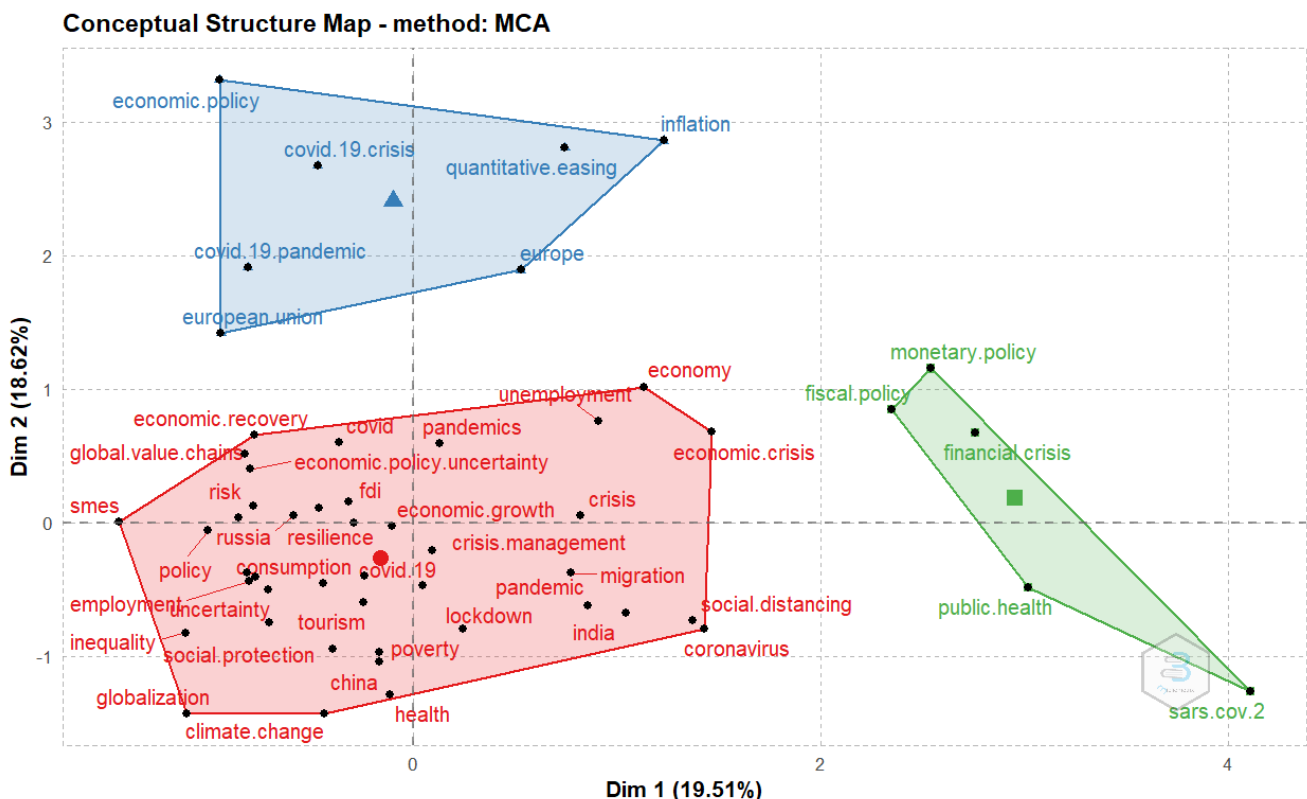


Figure 2. Cluster analysis based on Multiple Correspondence Analysis (MCA)

In addition to use the MDS approach, this study also describes the conceptual structure map of each word or contextual structure map that often appears in COVID-19 and exit policy research using the *Multiple Correspondence Analysis (MCA)* approach.

In this data, there are three areas divided into green area, red area, and blue area, where each area contains words that are related to each other. Based on the image above, the red area shows a greater variety of words included. This indicates that many studies link the words listed in this area.

From these two cluster analysis approaches, it can be concluded that there are at least 4 research lines, namely: (1) Economic policies during and after the covid-19 pandemic related to fiscal policy (exit policy on fiscal); (2) Economic policies during and after the covid-19 pandemic related to health sector policies (exit policy

& public health); (3) Economic policies during and after the covid-19 pandemic related to monetary policy and inflation (exit policy on monetary policy); and (4) Economic policies during and after the covid-19 pandemic related to the small and medium enterprise sector business (exit policy and SMEs).

The COVID-19 outbreak is an unforeseen situation, which has left policymakers in various countries confused, causing unprecedented changes and adjustments in various fields of human activity and triggering a global economic contraction (Collins et al., 2020).

The pandemic's impact on health around the world has been compounded by disruptions to the global economy based on reduced market capabilities. The impact of COVID-19 on economies has created supply and demand disruptions, inequalities and

homegrown insecurity (Barneveld et al., 2020). Early in the spread of COVID-19, news about the United States' monetary policy and fiscal stimulus bill boosted stock market development and long-term growth, but did little to improve short-term growth expectations (Gormsen & Koijen, 2020).

Policymakers' different ways of implementing policies have implications in the socio-economic field, especially in explaining the range of mortality rates recorded in the data. For example, the lockdown policy was initially judged to be effective in reducing the number of new cases in countries where it was implemented, compared to countries where it was not. This is especially true about 10 days after policy implementation. The results showed that lockdowns were effective in reducing the number of people infected (Alfano & Ercolano, 2020). Some countries that experienced delays of more than a week in enacting lockdowns have lost more than half a million lives. On the other hand, countries that were able to act quickly were able to save more lives than those that delayed (Balmford et al., 2020).

However, lockdown or social distancing policies have direct negative effects on the market due to their adverse effects on market disruption and economic activity, this is because the main purpose of lockdown is to focus on the health sector by reducing positive cases of COVID-19. However, after the economic conditions worsened, governments in various countries began to implement public awareness policies, testing and quarantine policies, and income support that were expected to help the market return to a positive state (Ashraf, 2020).

COVID-19 shows that economies will face an uncertain future in the next few years, and anticipating and resilience to shocks must be a top priority in research and development. Post-COVID-19 development must be based on knowledge and politics that are transformative, sustainable and inclusive (Leach et al., 2021).

Finally, from all the countries studied, it can be concluded that the key points of the economic exit policies pursued by various countries revolve around digitalization and innovation, the vulnerability of small companies, and the importance of good governance. Likewise, the importance of supporting innovation and digitalization in the private sector.

The ability to quickly adapt to rapidly changing market conditions, captured by a company's ability to innovate, has become key in recent months (Muzy et al., 2022). To the same extent, the development of the

digital world has increased its relevance as a way to compensate for the physical lag caused by social distancing policies enacted to reduce virus transmission. Supporting companies in maintaining momentum and increasing efforts in innovation and digitalization is expected to help in driving sustainable productivity growth.

It is critical for developing countries to find innovative policy mechanisms to achieve sustainability in a cost-effective manner. This requires identifying appropriate policies that align economic incentives for long-term development (Barbier & Burgess, 2020). In response to the COVID-19 pandemic, some government policies in some countries have been more effective in mitigating the pandemic than others. Government leaders and public administrators can learn from other countries and adapt these lessons to crisis management and health systems to apply to their societies (You, 2020).

## CONCLUSION

The focus of this research is to try to find out the extent of the development of scientific literature on the theme of COVID-19 and exit policy in the trend of keywords, authors and institutions affiliated with the author. The results show that there has been an increase in the number of articles published on this theme from 2019 to 2021.

Research on the theme of COVID-19 and exit policies has been carried out in various countries. Based on the cluster analysis approach, it can be concluded that there are at least 4 lines of research, namely: (1) Economic policy during and after the COVID-19 pandemic related to fiscal policy (exit policy on fiscal); (2) Economic policy during and after the COVID-19 pandemic related to health sector policies (exit policy & public health); (3) Economic policy during and after the COVID-19 pandemic related to monetary policy and inflation (exit policy on monetary policy); and (4) Economic policy during and after the COVID-19 pandemic related to the small and medium enterprise sector business (exit policy and SMEs). Based on research using the bibliometric method, it was found that the keywords most widely used by authors in scientific journals on the theme of COVID-19 and exit policy are COVID-19, Pandemic and Coronavirus.

Some recommendations that can be implemented by Indonesia based on the experience of various countries in implementing economic policies as an exit policy during the COVID-19 pandemic include closing the tourism industry, reducing public transportation,

providing social assistance and social insurance, assistance for the labor market, fiscal policy, monetary policy and private sector economic burden sharing. More specifically in the business sector, policies to ease loan payments, credit guarantees, purchase of commercial paper must continue. Instruments such as subsidies for companies to reduce employee layoffs are also possible. In addition, there are opportunities for innovation with the aim of more sustainable development by replacing fuel subsidies with renewable energy investments and reallocating irrigation subsidies to improve water supply and sanitation.

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