EMAGRAP
Economic Military and Geographically Business Review
EMAGRAP 3(1): 1–22
ISSN 3025-3160

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Fiscal strategies amid global uncertainty: Strengthening indonesia's economic and investment resilience through a national supply chain resilience roadmap

Mesakh Roi Pratama Ginsu[1,*], Laura Amaria Dwiputri Julianti[1], Fachry Haris[1]
[1] *Department of Economics, Faculty of Economics and Business, Universitas Airlangga, Surabaya, East Java 60286, Indonesia.*
*Correspondence: mesakh.roi.pratama-2024@feb.unair.ac.id

Received Date: June 28, 2025 Revised Date: July 29, 2025 Accepted Date: July 30, 2025

ABSTRACT

Background: When global conditions are unstable, policy-making driven by urgency and efficiency is necessary to maintain national stability, particularly in Indonesia. In the context of a trade war, the key threats to address are declining investment and weakening economic activity. One of the instruments that can be utilized is fiscal policy. Nevertheless, fiscal resources are limited. Hence, the main questions to be answered in this article are: (1) what's the most significant sector that affects economic growth and investment performance? (2) what's the strategy and solution that can be implemented to achieve the fiscal efficiency point?. **Methods**: To answer the first main question, use a literature review. All literature used in this article is from the Scopus index database. On the other hand, this article also apply the adaptation of the National Supply Chain Resilience Roadmap (NSCRR) method while combining it with a literature review to formulate a fiscal policy strategy that ensures efficient implementation. **Findings:** Supported by existing literature, this articles identifies infrastructure as the sector with the highest significance in boosting economic growth and investment in Indonesia. Additionally, authors propose three complementary technical strategies to ensure the efficient implementation of fiscal policy. These three strategies include the Fiscal Deficit Reduction and Accountability Reform System (FIDARS), the National Integrated Smart Government System (NISGS), National Infrastructure Technology Transfer Scheme (NITTS) **Conclusion**: To attract FDI, investment in public goods such as infrastructure is empirically proven to have a more massive impact and is more efficient due to the vast fiscal multiplier that is greater than in other sectors. Yet, the fiscal allocation needs to be implemented strategically and efficiently by using the three strategies mentioned above. **Novelty/Originality of this article:** The new adaptation of NSCRR to create fiscal strategies has not been written before.

KEYWORDS: fiscal strategy; global disruption; national supply chain resilience roadmap.

1. Introduction

The recent trade policy changes, particularly on tariffs implemented by the United States since April 2025 have significantly contributed to the escalation of global uncertainty. These actions followed by retaliatory measures from other countries such as China and the European Union have intensified the situation further and has led to a deterioration in global economic prospects (IMF, 2025). Based on the Economic Policy Uncertainty Index

Cite This Article:
Ginsu, M. R. P., Julianti, L. A. D., & Haris, F. (2025). Fiscal strategies amid global uncertainty: Strengthening indonesia's economic and investment resilience through a national supply chain resilience roadmap. *Economic Military and Geographically Business Review, 3*(1), 1-22. https://doi.org/10.61511/emagrap.v3i1.2025.2151

(EPU), the level of uncertainty arising from trade policy shifts in 2025 has reached its highest level, especially when compared to previous years and decades.

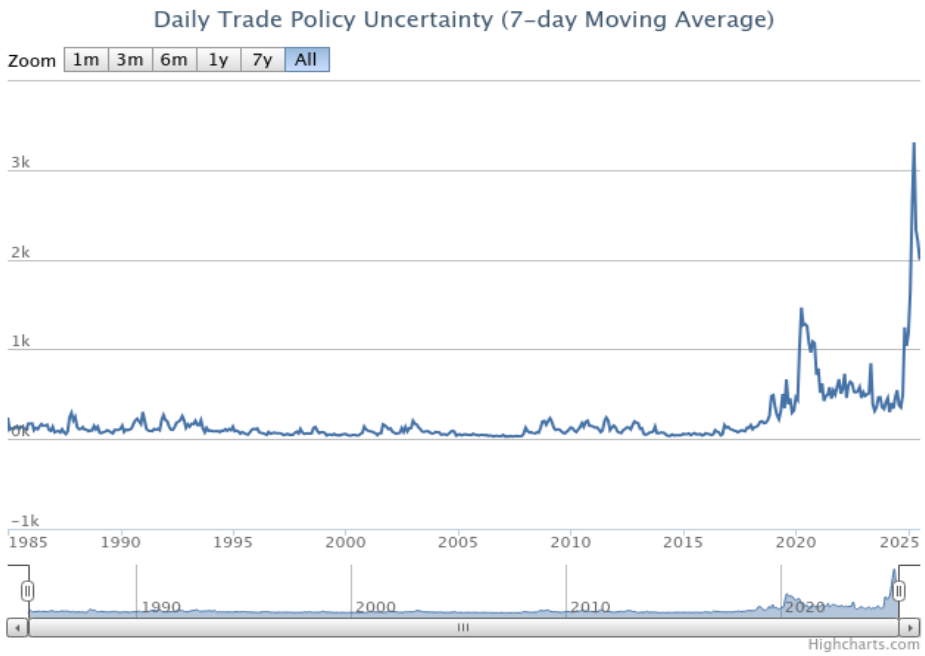

Fig. 1. Daily trade policy uncertainty (7-day moving average) (EPU, n.d.)

Escalation of policy uncertainty has huge consequences for the global economy, as uncertainty can lead to higher stock price volatility, a decline in investment, and an increase in unemployment. This is especially true in sectors that are more sensitive to policy changes (Baker et al., 2016). This condition is reflected in the growth rate of total Gross Domestic Product (GDP), which is expected to slow down to only 2,3 percent in 2025, which is significantly lower than the growth rate recorded in 2024. Moreover, the 2025 growth rate falls below the threshold for a global recession, which is set at 2,5 percent. This can indicate a shift towards a potential recession (OECD, 2025).

The global economic slowdown is also very likely to worsen fiscal challenges in various countries as it compels governments to increase the debt-to-GDP ratio. This is evident from the projected rise in the global-to-GDP ratio, which is expected to increase to 85 percent in 2025. Emerging markets and developing economies are particularly vulnerable, with public debt levels rising by 6 percent of GDP. Fiscal strain is also intensified by the growing interest burdens, as the interest payment-to-GDP ratio reached an average of 3,3 percent in 2024 (OECD, 2025).

In the other hand, ersistent trade policy uncertainty, broader policy shifts, cross-country divergence in paths to monetary policy normalization like by the Federal Reserve, and a more volatile currency outlook also could further amplify bouts of financial market volatility. This can increase the outflow risk of cross-border capital which would particularly affect countries with higher import dependence or a greater share of dollar-invoiced import (IMF, 2025; Tan et al., 2023).

In the context of global uncertainty, effective fiscal management becomes crucial and critical (Kebalo & Zouri, 2024). An ideal fiscal framework should encompass long-term sustainability by avoiding pro-cyclical fiscal behavior (Ódor & Kiss, 2017), focusing public expenditure on protecting the livelihoods of people and market entities (Shen et al., 2023), and carefully managing the maturity structure of government debt (Auray & Eyquem, 2017). Furthermore, emerging markets such as Indonesia and India are encouraged to emphasize their fiscal expenditure for investments and social programs to support economic resilience (IMF, 2025).

The geopolitical tensions of the trade war produce significant negative externalities, the consequences of which are not confined to the primary belligerents but extend to peripheral economic regions like Southeast Asia. Mao & Görg (2020) document these repercussions, which include the exacerbation of technological disparities, constraints on economic growth, and the establishment of convoluted regulatory frameworks that burden private enterprise. As a result, the prevailing landscape compels a rational pursuit of trade diversification as a risk mitigation strategy.

The Indonesian economy is not insulated from the adverse effects of the trade war. The nation's vulnerability is underscored by the fact that U.S. tariffs apply to 32% of its goods, making it the sixth most-affected country in the Association of Southeast Asian Nations (ASEAN). This tariff exposure creates a distinctively unfavorable position for Indonesia, stemming from its structural dependence on the United States as a primary market for its export commodities. Therefore, without a strategic intervention, Indonesia confronts the potential for a severe decline in its export performance.

On the other hand, Indonesia's Foreign Direct Investment (FDI) also decreased. It happens because FDI from foreign countries tends to diversify its production in the United States to avoid the United States' tariffs. The other factor is that the United States' consumption is the highest among all countries around the world, which is 68% of its Gross Domestic Product (GDP), amounting to USD 23,542 trillion (Joint Economic Committee Republicans, 2024). Those amounts are surely appealing to foreign investors. If the trade war continues for a longer period, it will affect Indonesia's economic growth.

However, Indonesia's economic situation is still possible to defend, even increasing it by taking a strategic position and taking advantage of the current situation. Even so, Indonesia, as one of the ASEAN Countries, should still resist and stay competitive to grab foreign investors' interest. The record shows that in 2022, when Global FDI decreased to 12%, ASEAN territories succeeded in attracting foreign investment in a significant amount, in fact, it was the highest (UNCTAD, 2021). It indicates ASEAN, including Indonesia, is still on the list of countries for investors to invest in.

Furthermore, Indonesia also has some advantages, including comparative and absolute. The number of advantages is more than in other ASEAN countries, so it should be more appealing. Those advantages include abundant natural resources, a vast domestic market, and an adequate geographic position for logistic activity. However, in the middle of those advantages, Indonesia still struggled with a major obstacle. Those obstacles include a deficit in infrastructure development, inefficient regulation and bureaucracy, a low human resources community, and a political-economic situation in Indonesia (Lipsey & Sjöholm, 2011; Priyadi et al., 2024; Sodik et al., 2019; Suroso et al., 2024; Suryanta & Patunru, 2023). Some of those obstacles, especially those related to human resources quality and infrastructure deficit, could be addressed through a fiscal approach.

In times like this, it is very important to look for an effective fiscal policy, this happens for a couple of reasons. First, an effective fiscal policy can contribute to better economic outcomes by boosting potential growth by investing in activities that raise productivity, help monetary policy become more effective by increasing bond supply, and in the long run would also reduce income inequality (Ubide, 2016). Second, an effective fiscal policy, particularly in public sector efficiency can help lower public debt and enhance its fiscal sustainability (Chrysanthakopoulos et al., 2025). Accordingly, a study using a panel of 158 countries from 1990 to 2017 has found robust evidence that increasing an effective fiscal policy is mainly done by improving fiscal discipline which is possible through; better institutional quality, stronger fiscal balance, and enhanced tax revenue mobilization (Apeti et al., 2025). Indonesia can create a fiscal space through revenue enhancement and expenditure reallocations. To ensure this process can contribute to national development, fiscal policy must be conducted with good consideration and an efficient system.

However, fiscal resources are scarce. According to the World Bank Group (2021), Indonesia can create a fiscal space through revenue enhancement and expenditure reallocations. To ensure this process can contribute to national development, fiscal policy must be conducted with good consideration and an efficient system.

2. Methods

To identify the most significant sector enhancing Indonesia's Foreign Direct Investment (FDI), a comprehensive literature review was conducted. The literature was sourced exclusively from the Scopus Index Database, with a selection criterion of articles published within the last 15 years.

On the other hand, the authors use different methods to create the fiscal strategy. Referring to the urgency, the writer uses the National Supply Chain Resilience Roadmap (NSCRR) method to build a strategic framework for policy implementation. National Supply Chain Resilience Roadmap (NSCRR) is a strategic framework aimed at strengthening logistics and production resilience in key sectors such as defense, energy, and food for. This method is rooted in scenario planning, which was developed after World War II in the field of military planning. Scenario planning is defined as the discipline of rediscovering the power of entrepreneurial vision in times of rapid change, growing complexity, and real uncertainty (Wack, 1985). Schoemaker (1995) emphasized its ability to capture a wide range of possibilities that are often overlooked, while Thomas & Chermack (2018) view it as an effective practice to support strategic dialogue and broaden the perspective of decision-makers.

The National Supply Chain Resilience Roadmap (NSCRR) has advantages compared to other analysis methods, such as traditional risk assessment. Unlike traditional risk methods that are more static and mostly rely on historical data and fixed assumptions, NSCRR uses scenario planning, which is more relevant today due to the many uncertainties that may suddenly appear in the future. With logistics costs reaching around 23.5% of GDP or more than twice the average of developed countries, Indonesia faces serious challenges in achieving efficient logistics (Prakoso et al., 2021). Infrastructure gaps and disaster risks make the national logistics system vulnerable to disruptions. In this context, the NSCRR method becomes relevant, as it can help create infrastructure policies based on anticipatory scenarios that support risk-based and sustainable infrastructure development.

Although scenario planning is not a new concept, it has not been fully applied in the context of logistics and strategic production resilience, especially in unexpected events like the trade war between the United States and China. That is why NSCRR can be a crucial strategic step. This roadmap is designed to provide a systematic guide for organizations or countries to identify potential disruptions, build anticipatory scenarios, and develop recovery mechanisms that are strong and responsive.

NSCRR is a strategy-making method within the corporate context that includes several stages: supply chain exploration, scenario development, system analysis, definition of strategies, roadmap development, and signal monitoring considerations (Olivares-Aguila & Vital-Soto, 2021).

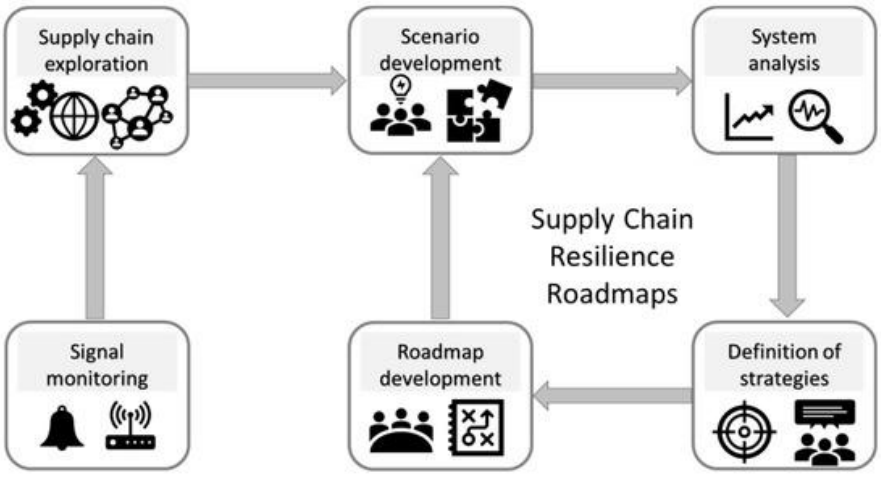

Fig. 2. The NSCRR origin model
(Olivares-Aguila & Vital-Soto, 2021)

The first step in supply chain exploration (SC exploration) or supply chain mapping has the purpose to examine and understand how the supply chain system works. It includes all the parties or operational environments involved. Golan et al. (2020) stated that SC exploration has three parts, which are upstream mapping, downstream mapping, and midstream mapping. The second step is scenario development, which has the purpose of developing a few scenarios that might happen in order to help us understand the unseen risks and potential. The third step is to analyze each scenario happening with a simulation method. This analysis intends to test and understand the impact of disruption on the supply chain system. The obtained result from the simulation analysis can be used to predict the long-term impact and construct the optimal recovery strategy.

After analyzing the scenario, the fourth step can be run, which is to develop the strategy to anticipate the impact as pictured in the analysis result. There are two usable strategies such as the proactive strategy and the reactive strategy. The proactive or preventive strategy tends to be used to avoid potential risks, such as collaboration, redundancy, and segmentation. On the other hand, a reactive strategy tends to be used when the risks are already happening. Therefore, the output strategy is an adjustment based on reality. After the results of various scenarios and strategy development are obtained, roadmap is needed as a systematic framework to navigate the direction of action while facing a great disruption on the planning level. Lastly, inside NSCRR, there's a step that aims to protect the relevance of the roadmap, but also to identify the potential disruption by monitoring systematically through internal data and external system trends. This step is called signal monitoring.

However, NSCRR has to be adapted and adjusted toward the needs of fiscal strategy design. In response to those needs, this article try to adapt the NSCRR model so it can be applied to fiscal strategy analysis.

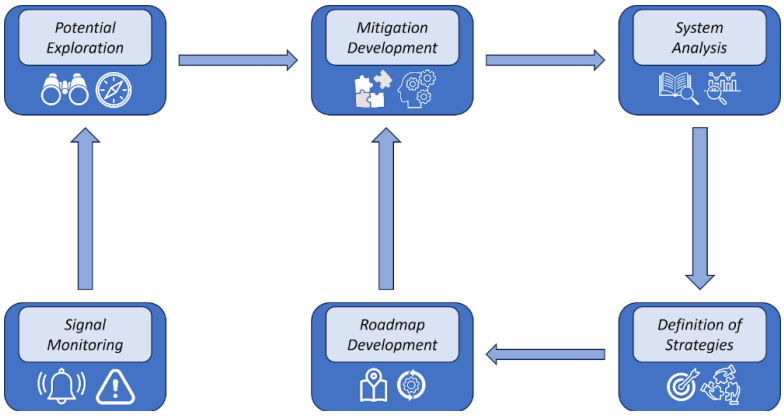

Fig. 3. The adapted NSCRR model

The key stage of the original model that requires adaptation is supply chain exploration and scenario development. These terms have a connotation that refers to the context of the supply chain, which is a corporate problem that is not relevant to our topic.

Initially, supply chain exploration within the conventional model is conceptualized as a mapping process designed to understand the operational dynamics of a supply chain, encompassing its stakeholders and environment. According to Golan et al. (2020), this exploration traditionally comprises three primary stages: upstream mapping (suppliers), downstream mapping (customers), and midstream mapping (production processes). Since this framing is not directly relevant to fiscal strategy, our study adapts it into potential exploration, which focuses on identifying Indonesia's fiscal and infrastructural potentials as a preliminary step. In this stage, instead of suppliers and customers, the emphasis is placed on productive regions with poor connectivity, infrastructure sectors with high fiscal multipliers, and institutional stakeholders relevant to fiscal performance.

The second stage, scenario development, in the original NSCRR model is defined as a process aimed at understanding unforeseen risks and opportunities in order to formulate

an adaptive strategy. Its primary objective is to ensure that the resulting strategic plan remains relevant for medium to long term decision making. In its original form, this stage was designed to anticipate risks and opportunities within supply chains, typically through analytical techniques such as Anticipatory Failure Determination (AFD) and Red Teaming.

In this adaptation, the stage is recontextualized as mitigation development, which refers to the systematic formulation of mitigation measures for fiscal risks that have been identified in the Indonesian context. These risks include the persistence of budget deficits, the problem of weak accountability mechanisms, and the structural dependence on foreign technology. By treating these risks as fiscal scenarios, the framework does not merely replicate the supply chain logic of the original model but instead transforms it into a mechanism for identifying fiscal vulnerabilities and designing targeted responses. This adaptation allows for the development of policy strategies that are not only more precise and context-specific but also aligned with Indonesia's broader fiscal and developmental priorities.

Even so, the NSCRR method has certain limitations, particularly due to its limited literature base as a policy-making strategy. Moreover, this method only addresses the general concept of strategy without providing detailed information on technical implementation and evaluation.

In addition to the NSCRR method, this article also conducted a literature review to identify the most significant sectors that enhance Indonesia's Foreign Direct Investment (FDI). The literature was exclusively sourced from the Scopus-indexed database, with a selection criterion of articles published within the past 15 years, except the essential articles. The distribution of Scopus-indexed articles is illustrated in Figure 4. The main research questions (RQ) of this paper are as follows, (1) RQ1, what is the most significant sector influencing economic growth and investment performance?; (2) RQ2, what strategies and solutions can be implemented to achieve fiscal efficiency?

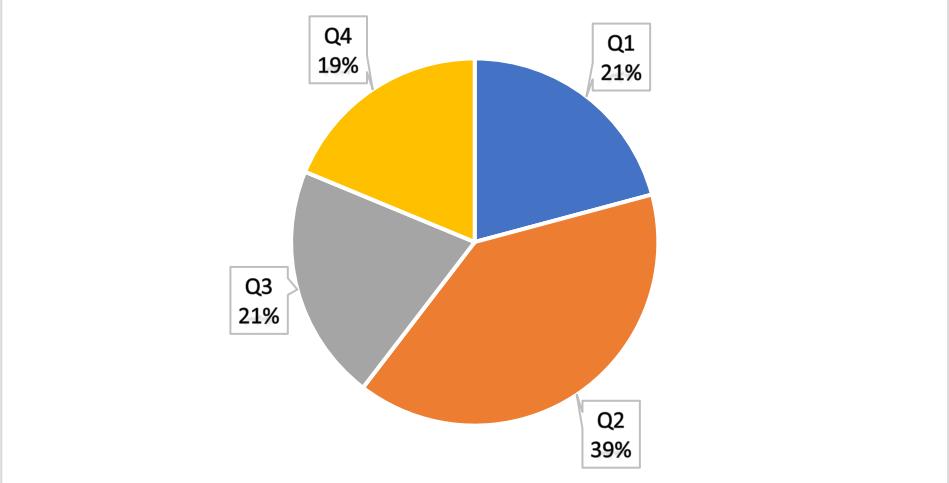

Fig. 4. Scopuss quartile distribution

3. Results and Discussion

3.1 Discover the significant factor

The most important sector to improve is infrastructure, since it can attract Foreign Direct Investment (FDI) (Khadaroo & Seetanah, 2008). Although some previous studies has stated that investment in human capital is the most important, since it can also increase Foreign Direct Investment (FDI), but a lot of them also stated that the significance of human capital specifically through education investment toward FDI is more relevant for countries that are not rich in natural resources (Miningou et al., 2020). Moreover, another study states that the use of knowledge-intensive workers can be fulfilled through labor mobility from

other countries, as companies would consider this method as more effective to reduce intra-firm transaction costs (Brzozwski et al., 2016). This condition however is not the same for infrastructure investment.

According to several researchers, investing in infrastructure has been proven to bring a bigger and more efficient impact on economic growth and investor attraction. This can happen because public investment in infrastructure has a larger fiscal multiplier effect (Deleidi et al., 2020; Luu et al., 2024; Saidi et al., 2020; Sheel, 2013). Moreover, investment in infrastructure also shows a more significant effect when compared to education investment (Miningou & Tapsoba, 2020). Empirical studies have shown that the benefit of investing in infrastructure can be felt both at the national level like India, and at the regional level, such as in Asia, Europe, and Africa (Kaur et al., 2016; Luu et al., 2024; Tsaurai, 2025). With this information in mind, therefore, fiscal allocation for infrastructure development is important and has a clear urgency to increase investment and economic growth in Indonesia.

3.2 NSCRR implementation

3.2.1 Potential exploration

Fiscal spending on Infrastructure development needs careful planning and consideration to ensure its efficiency and effectiveness, especially during a critical period. In line with the adaptation of the NSCCR method, identifying potential exploration becomes essential to guarantee the effectiveness of fiscal spending for infrastructure.

Firstly, Indonesia needs to identify areas with productive potential that currently lack proper logistical access. This is crucial since logistics play an important role in strengthening the domestic market, supporting growth strategies, and connecting the country (Guasch, 2022). Not only that, it is also necessary to identify domestic markets that can be strengthened through better infrastructure connectivity, since improving the transportation system has been proven to support development through reducing consumption sensitivity and encouraging consumption growth (Chen et al., 2024).

At present, Indonesia's logistics system is still inefficient. This can be seen from the high logistics cost, reaching around 23,5% of the national Gross Domestic Product (GDP). As a comparison, developed countries usually spend less than 10% of their GDP on logistics (Prakoso et al., 2021). This condition can hinder the competitiveness of Indonesian businesses, especially in times of global uncertainty. Therefore, mapping is needed for high-potential regions that are still disconnected from the domestic market, such as East Nusa Tenggara (Gai et al., 2019) and Sumatra Island (Saraswati et al., 2021). Subsequently, infrastructure improvement is also crucial since it can contribute to increasing FDI attractiveness and supports sustainable economic growth (Saidi et al., 2020).

3.2.2 Mitigation development

In developing fiscal spending strategies for infrastructure, it is necessary to analyze all the possible risks that could affect the success of the strategy. This article identifies three key potential risks through literature review, which are (1) budget deficit, (2) unaccountability, (3) technological dependence on foreign countries.

A budget deficit is the amount by which the government's expenditures exceed its revenues for a specific fiscal year (Sibhoan & Vanessa, 2016). In the context of global uncertainty, one of the key factors that can influence the budget deficit is the rise of public debt, as it tends to cause fiscal imbalance (Gnimassoun & Santos, 2020). As the Debt-to-GDP ratio is projected to rise by 85 percent in 2025, a strategy to reassess the budget deficit becomes important. According to several studies, the rising of public debt specifically in Indonesia and Malaysia has led to a decline in FDI's contribution to economic growth (Yong et al., 2017). This is concerning as FDI has been proven to strengthen regional stability and adaptability during economic disruptions (Bernat et al., 2025).

The efficacy of any public policy is fundamentally contingent upon its execution through a robust and transparent accountability system. An effective accountability mechanism not only ensures that objectives are met but also serves as a critical safeguard against administrative failures, such as supervisory inefficiency, fragmentation of authority, and the pervasive threat of corruption. As established in the literature, the consistent application of such accountability is instrumental in fostering public trust (Campbell, 2023; Fard & Rostamy, 2007). This trust forms the bedrock of a government's legitimacy and is a prerequisite for policy success. Indeed, the level of public support, which is cultivated by trust, is a primary determinant of a policy's ultimate impact and sustainability (Svedin, 2012). Consequently, accountability should be regarded not merely as a procedural formality, but as a cornerstone of effective governance that warrants paramount attention.

Based on data from 95 countries between the years 2008–2019, Chan et al. 2023 showed that FDI inflows have a positive relationship with technology transfer, especially in developing countries. A similar finding is also explained by Wie (2005) who identifies four main routes of technology transfer in Indonesia, which are FDI, technology licensing agreements without foreign ownership, capital goods imports, and Indonesia's participation in global trade through export. However, even though there are many mecchisms of technology transfer, the amount of FDI inflows to Indonesia, especially in the infrastructure sector, is still relatively low.

Those three scenarios can be depicted using the early warning effectiveness matrix in Figure 4. The x-axis represents the level of consequences from low to high. On the other hand, the y-axis represents time detection. Positive value means mitigation can be held because the problems are detectable before their consequences exist. Zero value means the problems can be detected only if their consequences are still occurring. Negative value means mitigations can not be held because the problems can be detected only if their consequences have already occurred. The first scenario (S1), second scenario (S2), and third scenario (S3) refer to the budget deficit, unaccountability, and technological dependence on foreign countries. All of those scenarios are located in the first quadrant, which means that their consequences are reducible and preventable.

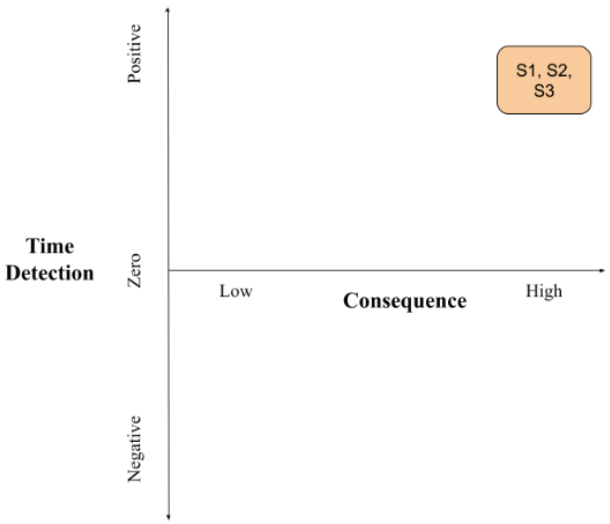

Fig. 4. Early warning effectiveness matrix

3.3 System analysis, definition of strategies, and roadmap development

3.3.1 Budget deficit

Budget deficits can significantly reduce the economic performance of the states, and this is possible because budget deficits, primarily in times of economic uncertainty, can raise public debt and can create fiscal imbalance (Gnimassoun & Santos, 2020), which will then

lead to a higher interest rate, and decreased investment, creating a crowding out effect (Oskooee & Economidou, 2006), this will also create a negative impact on economic growth, as stated by Leshoro (2021) in the case of South Africa, a budget deficit beyond -3,6 percent can has a severely detrimental impact on economic growth in the country. Hence, an improvement on the current budget deficit becomes important.

According to the research held by Baldacci et al. (2012), when a country is experiencing economic uncertainty, say a financial crisis, debt reduction can be done by fiscal consolidations that rely on revenue-enhancing measures rather than expenditure-based cuts only. Moreover, a study held by Saleh & Harvie (2005) showed that it is important for the government to distinguish between consumption and investment expenditures, especially when the government is in the process of reducing the fiscal imbalances in the country.

In light of these findings, examining the structure of Indonesia's 2025 Government Budget/*Anggaran Pendapatan dan Belanja Negara* (APBN) becomes relevant to ensure whether the government's current budget is effective and is strategically designed to prepare Indonesia for potential economic uncertainty. According to the report by Indonesia's Ministry of Finance and the Directorate General of Budget, ministry with the highest budget shares in 2025 are the Ministry of Defense (*Kementerian Pertahanan*) (IDR 165.16 trillion), followed by the Indonesian National Police (*Polri*) (IDR 126.02 trillion), and the Ministry of Public Works (*Kementerian Pekerjaan Umum*) (IDR 75.63 trillion). This composition marks a shift from the 2024 budget allocation, in which the Ministry of Public Works (*Kementerian Pekerjaan Umum*) held the largest budget (IDR 143.37 trillion) which indicates an increase in military budgeting.

Such prioritization needs critical examination, as existing empirical literature by Saeed (2023) has stated that a robust panel data analysis covering 133 countries from 1960 to 2012 found that an increase in military expenditure equivalent to 1 percentage point of GDP can reduce economic growth by 1.10 percentage points. Moreover, the Draft State Budget Law (*Rancangan Undang-Undang APBN*) for 2025 stated that the majority of the Ministry of Defense's budget allocation is largely directed toward management support programs, which according to the Decree of the Secretary of the Secretary General of the Ministry of Defense of the Republic of Indonesia No. EKP/195/II/2022, these management support programs primarily encompass administrative functions (human resource management, finance, organizational affairs, and legal matters) as well as support services (public communication and information, information and technology management, and healthcare services) which several of which are more consumption-oriented rather than investment-focused.

Although the 2025 government budget deficit has been set at a moderate level of 2.53 percent of GDP (Kemenkeu, 2025), the previous information shows that there is still a need to improve the current government budget by making it more aligned with global outlooks and Indonesia's national development priorities. This is important to ensure the inflows of FDI, which have been proven to strengthen regional stability and adaptability during economic disruptions (Bernat et al., 2025). Furthermore, the current government budget should also take into account the importance of effective execution in a decentralized fiscal system for more positive governance-related performance (World Bank Group, 2021b; Avcı & Karasoy, 2020).

According to The Indonesia Public Expenditure Review (PER) by World Bank Group (2021), Indonesia still lacks 'intervention logic' design, good quality of performance information, formal expenditure reviews, and effective coordination. With that information in mind, it is important to enable a performance-based budgeting system as well as promote budget transparency through encouraging public participation and mitigating the principal-agent problem, as it has been proven to be successful in some countries such as South Korea and Estonia (Jung, 2022; Ketners et al., 2024). This article develop an innovation that might prevent a budget deficit by adapting existing practice performance design by Webber (2004) with some adjustments for Indonesia's need, which this article named the Fiscal Deficit Reduction and Accountability Reform System (FIDARS).

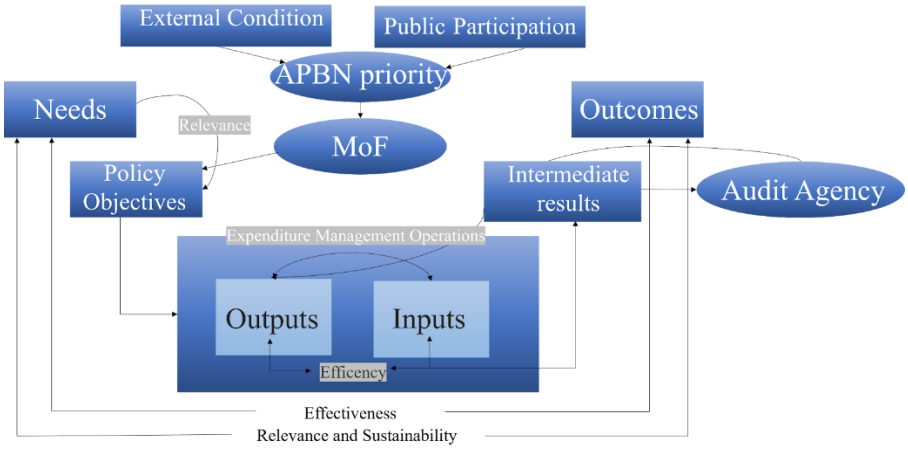

Fig. 5. The FIDARS model

To enhance the effectiveness of public spending in a country with a decentralized governance system such as Indonesia, it is essential to adopt a robust intervention logic framework (World Bank Group, 2021). The proposed integration of FIDRS can help strengthen Indonesia's public financial management by embedding performance logic in all budget formulation and execution processes.

FIDRS addresses the utilization of a standardized logic model framework. This requirement complements existing legal mandates, such as Law No.17/2003 on State Finance which mandates that budgeting must be based on measurable performance. It also requires ministries and local governments to develop a budget that is aligned with the Government Work Plan/*Rencana Kerja Pemerintah* (RKP). Moreover, Law No.1/2022 on Intergovernmental Fiscal Relations/*Hubungan Keuangan antara Pemerintah Pusat dan Pemerintah Daerah* (HKPD) has introduced the General Budget Policy and Provisional Budget Ceiling Priorities/*Kebijakan Umum Anggaran (KUA) dan Prioritas Plafon Anggaran Sementara* (KUA-PPAS), which the local governments are obligated to outline program objectives and budget ceilings. However, as mentioned by The Indonesia Public Expenditure Review (PER) by World Bank Group (2021), Indonesia still has a weak link between spending and tangible outcomes because outputs are frequently misclassified, resembling inputs and determined at the discretion of ministries without standardized definitions.

FIDRS offers an administrative reform solution by requiring ministries to submit logic-model budgeting frameworks as a part of their Performance-Based Budgeting . This is important because logic models are specifically helpful to help ministers create a clear distinction between output and impact, and highlight areas of activity that are needed to increase the impact according to a research done by Scott et al. (2018) who uses the logic model by McLaughlin & Jordan (1998). based on the framework developed by McLaughlin & Jordan (1998) logic model should consist of five interrelated components, (1) resources that include human and financial resources and other input needed to support the program; (2) activities which include all actions necessary to produce program output; (3) output which are the products, goods, and services provided to the customer; (4) the customer, needed in the middle of the chain of logic to explain what leads to what; (5) the external conditions under which a program is implemented and how those conditions affect outcomes.

Historically, an empirical studies has showed that the implementation of Performance-Based Budgeting which are similar to the proposed idea of FIDRS has on average, a reduction of 1.3 percent (p<0.01) points in budget variance, and cost per service unit decreased by USD 5 (p<0.05), it can also increase the frequency and detail of performance report by 25% in companies in Australia, United States, United Kingdom (Abbasov, 2025). Moreover, in relation to fiscal performance, PBB with a strong public accountability requirement and provides for Published Results can reduce total state spending by at least 1.3 percent as a share of a state income, and 2 percent per capita (Crain & O'Roark, 2004).

Applied to Indonesia's context, this suggests that FIDRS, when operationalized the right way, could generate expected fiscal savings between 1.3 percent to 2 percent of the total government expenditure, through more targeted resource allocation and output verification. This means that for a budget of IDR 3.000 trillion, this equates to potential savings of IDR 39-60 trillion.

Based on the diagram above, under FIDRS, each ministry needs to describe and evaluate their programs based on people's needs and urgency and careful consideration of current global outlook. This includes factoring in external conditions such as macroeconomic outlooks, geopolitical risks, and policy shift. Ministries need to submit an annual budget that explicitly describes the logic linking inputs, planned activities, tangible outputs, and targeted outcomes. In accordance with Law No.25/2004 on National Development Planning, these proposals must be linked to national strategies and development priorities.

To enable more objective, data driven evaluations, a separate set of audit logic buddies that received authority from the Ministry of Finance and BPKP is needed to provide ministries with a list of high-quality, standardized, and auditable performance indicators. Ministries are encouraged to use these indicators for both output and outcome design. Ultimately, this can be operated by Bappenas with collaboration from BPS for data validity.

After indicator validation of the proposed logic model, the Ministry of Finance (MoF) will allocate funding based on urgency that can be assessed through the Short, Intermediate, and Long term outcomes. This will promote efficiency, reduce leakages, and align with performance-based budgeting. Additionally, communities and the public can provide feedback through open-access dashboards that track real time program outputs and compare them against original logic submissions similar to Indonesia Corruption Watch System (ICW).

As a simulation, when Indonesia wants to lower the state logistics cost to increase the inflows of FDI, the Ministry of Public Works and Housing need a detailed and logical explanation for their short, intermediate, and long term outcomes. For instance, short term outcomes will open functional logistics road access along more than 70 percent. In the medium term, transportation costs per ton-kilometer are expected to decrease by 10%. In the long term, it will reduce national logistics costs to near the target below 17 percent of GDP. With this information in mind, the MoF will make further decisions that are aligned with the global outlook on whether or not they should make it a priority.

Ultimately, FIDRS approach is not intended to replace existing performance-based budgeting practices, but to complement and strengthen the outline done by McLaughlin & Jordan (1998), which emphasizes the alignment of needs and outcomes, optimizing cost-effectiveness, and ensuring long-term fiscal and policy sustainability by also taking into account advice recommended by the World Bank Group (2021).

3.3.2 Unaccountability

Deficits in governmental accountability present a significant impediment to economic development in developing nations, correlating with poor economic performance, elevated unemployment, and high poverty rates. This link is empirically supported by studies such as Kalu & Ugbor (2022) in the context of Abia and Nigeria. Expanding this analysis, Berggren & Bjørnskov (2020) conducted a comprehensive study across 145 countries (1960–2014), concluding that weak judicial and oversight accountability is a significant driver of inequality. Moreover, poor accountability is directly linked to ineffective policy execution and systemic corruption, as shown by Abe (2011) in Nigeria. Consequently, strengthening accountability mechanisms is an urgent imperative; such reforms are essential for curbing corruption, cultivating public trust, and enhancing investor confidence, thereby fostering an environment conducive to increased domestic FDI (Ackert et al., 2008; Shamsi et al., 2013; Zheng & Xiao, 2020).

Despite a series of governmental efforts to improve accountability through regulatory frameworks, oversight institutions, and transparency-focused digital platforms, significant

challenges persist. The impact of these measures has been largely negated by fundamental issues such as a lack of systemic integration, inadequate legal recourse for violations, and minimal public participation in governance processes (Indonesia Corruption Watch, 2022). To remedy these deficiencies, this article propose the development and adaptation of the National Integrated Smart Government System (NISGS), a solution specifically engineered to overcome the critical challenge of system fragmentation.

NISGS is a smart government system with a primary focus on robust system integration of all government services and information. The main purpose is to create an open, efficient, and transparent government. NISGS has already been held in Russia, Kazakhstan, the European Union, and Africa (Manda, 2017; Sideridis et al., 2015; Turgel et al., 2022). Apleni & Smuts (2020) also state that NISGS empirically increases public services quality and inclusivity.

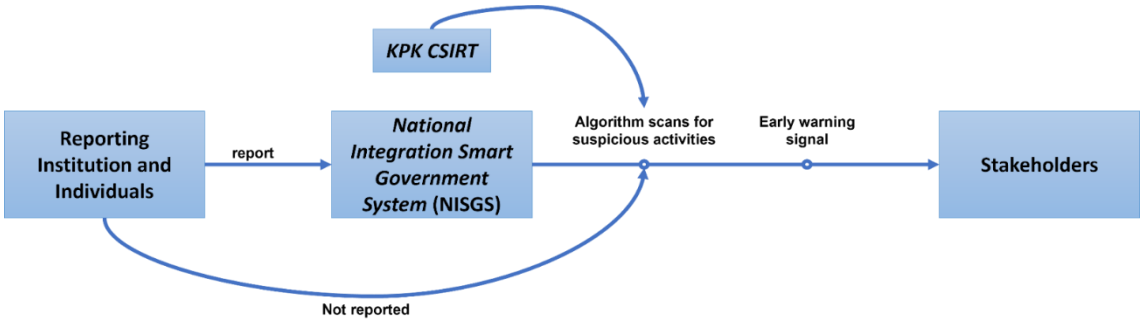

Fig. 6. The NISGS model

The adaptation of the National Integrated Smart Government System (NISGS) for Indonesia entails the creation of a singular, integrated ecosystem for all public services and governmental information. The conceptual roadmap for this system is delineated in Figure 6. The model is architected with the principal goal of optimizing the efficiency and efficacy of oversight mechanisms. Consequently, a foundational element of its design is the leveraging of technology to automate previously manual verification and compliance processes.

Reporting institutions and individuals would include ministries, agencies, and specific government officers or officials. Things that are required to be reported include progress on work responsibilities and financial statements. These reports are essential for detecting early signs of systemic corruption.

Moreover, the algorithm will also play a crucial role in this model, responsible for assessing and signaling suspicious reports and non-reporting parties, which enables law enforcement and the public to take action. If there's any violence or suspicious action detected, a warning signal will soon be forwarded to stakeholders, such as NGO, researchers, observers, media, and civilians. With a warning signal, oversight can be done directly by all parties to enhance the accountability of the government itself.

Additionally, the Computer Security Incident Response Team of the Anti-Corruption Commission/*Komisi Pemberantas Korupsi* (KPK CSIRT) will monitor the algorithm to ensure its normal operation and prevent sabotage. This dedicated oversight is a critical component of a broader strategy to enhance institutional effectiveness and transparency, which in turn is anticipated to significantly improve governmental accountability and cultivate greater trust among stakeholders.

3.3.3 Technological dependence on foreign countries

Currently, Indonesia's infrastructure development still relies heavily on importing heavy equipment, production machinery, and advanced technology. According to data from the BPS-Statistics Indonesia, in April 2025, the import value of machinery and mechanical equipment (including heavy equipment) reached USD 10.75 billion, with China as the main

exporting country, contributing about 39.48%, followed by Japan and South Korea. However, the high level of dependence on imports is closely linked to the role of foreign direct investment (FDI) coming into Indonesia.

The flow of Foreign Direct Investment (FDI) into Indonesia is relatively lower compared to other countries, especially in the infrastructure sector (Lipsey and Sjöholm, 2011). Disruptions to FDI flows, such as those caused by geopolitical tensions or trade wars, have the potential to reduce the intensity of technology transfer and disturb import activities to Indonesia. This condition is a significant concern because technology transfer is a key element in sustainable infrastructure development, which can drive economic growth and improve welfare in developing countries (Waroonkun & Stewart, 2008).

To anticipate the risk of disruptions in technology imports caused by trade wars that could cut off the supply of heavy equipment and production machinery, Indonesia needs to implement policies that strengthen international cooperation and promote the process of technology transfer (Oktay & Özer, 2011). One of the policies that can be implemented is the National Infrastructure Technology Transfer Scheme (NITTS). This scheme is a strategic policy proposal designed to address the challenges of dependence on infrastructure technology transfer due to reduced Foreign Direct Investment (FDI) in Indonesia. The scheme aims to ensure that even if FDI flows decrease, national infrastructure development will still benefit from access to advanced technology needed to improve efficiency, resilience, and national self-reliance.

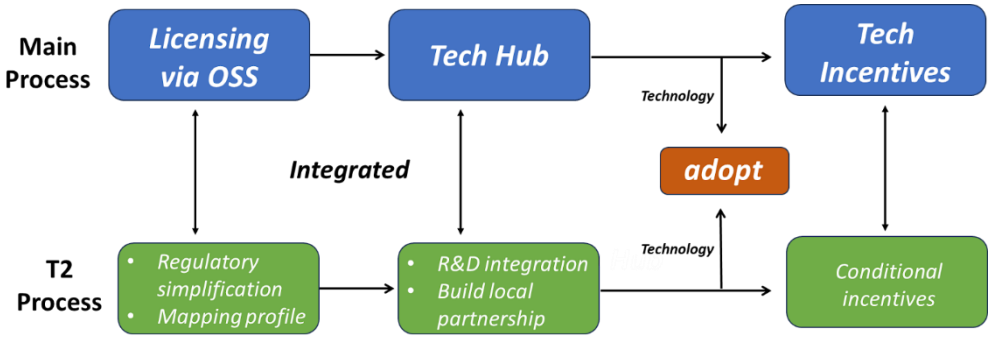

Fig. 6. The NITTS model

Based on the Figure 6, NITTS (National Infrastructure Technology Transfer Scheme) is divided into two integrated layers of process: the Main Process and the T2 (Technology Transfer) Process. Basically, the T2 Process functions as a support and clarification system for the main process. In the Main Process, the first stage starts with licensing via OSS (Online Single Submission), which aims to ease access for incoming foreign investments. Within this step, there are activities like regulatory simplification and profile mapping, which help reduce procedural complexity and identify the type of technology that fits local needs. The complexity of bureaucracy and overlapping regulations is expected to be resolved through NITTS.

After the licensing stage is completed, the investor will be directed to the Tech Hub, a collaboration center that validates, develops, and adjusts the transferred technology to match local conditions. At this stage, R&D integration and local partnership building are essential to ensure that the technology can be implemented sustainably by local communities and to promote direct collaboration with local institutions. The existence of a Tech Hub is considered a solution to governance weaknesses that have so far made Indonesia tend to be only a passive user of technology. The Tech Hub is expected to serve as a place for capacity building that strengthens human capital and supports national technological independence.

In the final stage, if the whole process runs successfully, the investor has the chance to receive conditional incentives for their contribution, specifically if the technology has been

adopted and brings real benefits in the field thus, incentive policies that often miss their target can be covered

The process of implementing NITTS indeed requires a long period of time and adjustment, since there are several weaknesses that need attention. The effectiveness of this scheme highly depends on the capacity of domestic institutions. Indonesia is still facing problems of inter-agency coordination, overlapping authorities, and corruption practices, which make the technology transfer scheme difficult to implement. In addition, the factor of human capital as both the executor and the receiver of technology transfer is also an issue that must be solved. Without competent people, this scheme will not run as expected.

As an initial step, a gradual implementation or pilot testing needs to be carried out. For example, the first stage can focus on sectors that depend on advanced technology, such as renewable energy and public transportation. The implementation can start in areas that have already been targeted for investment to encourage economic growth, such as Special Economic Zones. Each phase of NITTS can be tested partially first before being fully integrated. With this gradual approach, NITTS is not only a conceptual idea, but can also become a realistic and adaptive policy experiment that is able to reduce Indonesia's long-term dependence on foreign technology imports.

The absence of a national mechanism that systematically promotes technology transfer can prolong Indonesia's structural dependence on foreign parties in managing and developing strategic infrastructure. This condition not only slows down the modernization of the infrastructure sector but also increases vulnerability to geopolitical dynamics and global market changes. At present, Indonesia still heavily relies on imported technologies in major infrastructure projects, while lacking a framework to absorb and internalize foreign knowledge for long-term domestic use. By adopting the National Infrastructure Technology Transfer Scheme (NITTS), Indonesia is expected to create a more inclusive ecosystem for knowledge transfer, accelerate the modernization of the infrastructure sector, and reduce external dependence in the long term.

4. Conclusions

The trade war between the United States and China, which leads to tariffs imposition is the potential to decrease global economic expansion due to the disruption of the supply chain. Its consequences are felt by all countries through economic disruption and complex international trade policies. Indonesia's position is unfavorable in the current situation because of its high dependency on US export commodities.

To attract FDI, investment in public goods such as infrastructure is empirically proven to have a more massive impact and is more efficient due to the vast fiscal multiplier that is greater than in other sectors. Therefore, the infrastructure aspect has more urgency on the fiscal allocation policy. Yet, the fiscal allocation needs to be implemented strategically and efficiently. This article suse NSCRR to create the strategic framework to increase the efficiency of fiscal policy implementation. As the final output, authors discover three main problems and their mitigation, which are the Budget deficit that was overcome by the FIDARS model, the Unaccountability problem that was coped with by the NISGS model, and the Technological dependence on foreign countries that was solved with the NITTS model.

For optimal efficacy, authors advocate for a staggered implementation methodology for these strategies. This entails a sequential rollout wherein each phase is concluded by a rigorous performance evaluation. Such a cyclical process of execution and review is paramount for bridging the gap between policy design and practical application, allowing for data-driven adjustments.

In its implementation, the involvement of policymakers such as ministries and other high-level institutions is essential. The Ministry of Finance can utilize FIDARS to strengthen fiscal discipline. Furthermore, the realization of these strategies is contingent upon establishing synergistic Public-Private Partnerships (PPPs). These partnerships are essential for mitigating fiscal exposure through risk sharing and for capitalizing on private sector resources and ingenuity to secure superior outcomes.

Acknowledgement

The authors sincerely express profound appreciation to all individuals and institutions who supported this research. The support from our families, friends, and colleagues has been a valuable source of strength throughout the process. Also, the author appreciates the assistance in the form of insights, resources, and technical guidance throughout the process. May this collaborative effort not only benefit us, but also offer meaningful contributions to the ongoing development of knowledge in the future.

Author Contribution

Conceptualization, M.R.P.G., L.A.D.J., and F.H.; Methodology, M.R.P.G., F.H.; Investigation, M.R.P.G., L.A.D.J., and F.H.; Writing – original draft preparation, M.R.P.G.; Writing – review and editing, M.R.P.G., L.A.D.J.

Funding

This research received no external funding.

Ethical Review Board Statement

Not available.

Informed Consent Statement

Not available.

Data Availability Statement

No data available.

Conflicts of Interest

The authors declare no conflict of interest.

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Biographies of Authors

Mesakh Roi Pratama Ginsu, Interested in economics. Economics Undegraduate student from Universitas Airlangga, Indonesia.

- Email: mesakh.roi.pratama-2024@feb.unair.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Laura Amaria Dwiputri Julianti, Interested in economics. Economics Undergraduate student from Universitas Airlangga, Indonesia.

- Email: laura.amaria.dwiputri-2024@feb.unair.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Fachry Haris, Interested in economics. Economics Undergraduate student from Universitas Airlangga, Indonesia.

- Email: fachry.haris-2024@feb.unair.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Appendix 1. List of main export commodities from Indonesia to the United States, 2017-2024 (in thousand USD)

HSCode	Product	2017	2018	2019	2020	2021	2022	2023	2024
1511	Palm oil and its fractions, whether or not refined (excl. chemically modified)	584,971	550,375	525,865	609,003	1,468,260	1,757,429	1,518,747	1,299,433
6403	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...	692,662	746,828	747,447	675,693	1,093,839	1,226,086	984,172	1,198,437
8543	Electrical machines and apparatus, having individual functions, n.e.s. in chapter 85 and parts ...	1,075	4,186	32,927	34,947	125,713	764,079	777,233	1,025,816
8517	Telephone sets, incl. smartphones and other telephones for cellular networks or for other wireless ...	9,966	13,745	306,583	747,852	675,521	877,043	1,112,911	910,368
4011	New pneumatic tyres, of rubber	670,381	622,804	589,966	529,977	839,683	948,830	915,178	800,407
6404	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...	467,927	522,059	561,084	580,229	792,155	1,095,009	680,057	791,836
1605	Crustaceans, molluscs and other aquatic invertebrates, prepared or proserved (excl. smoked)	355,648	507,688	558,350	716,682	998,719	830,626	771,721	750,731
306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine ...	1,145,030	1,030,349	880,379	1,034,869	1,133,753	945,939	685,335	684,985
4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary ...	1,004,439	848,577	778,494	606,738	942,819	810,394	536,786	672,995