Nation State: Journal of International Studies, December, 2023
Vol. 6(2), pp. 96 – 116

E ISSN: 2621-735X
P ISSN: 2620-391X

Research Article

The Impact of Indonesia-China Nickel Cooperations on Indonesia's Economy and Environment

Farah Rosada, Raden Ambara Arya Wibisana, Arie Kusuma Paksi

Department of International Relations, Faculty of Social Science and Political Science, Universitas Muhammadiyah Yogyakarta – Indonesia

Corresponding email: farahrsd24@gmail.com

Submission: 29 March 2023 | Accepted: 08 June 2023

Abstract

As a country with abundant nickel potential, Indonesia possesses numerous advantages that have attracted China to expand its capital in the Indonesia. The collaboration between countries demonstrates the mutual national interests. Following the establishing of downstream policy through Ministerial Regulation No. 11 of 2019, the Indonesian Government has shown increased concern for optimizing its domestic nickel potential. This study examines the impact of cooperation between Indonesia's and China' in the nickel industry on Indonesia's economic growth and environment. It seeks to determine whether this cooperation benefit Indonesian people by fostering advancements in human resources indicators, infrastructure development, and presenting viable solution to environmental challenges through their joint efforts in the nickel industry or vice versa? The research method is qualitative, with critical approaches analyzed using economic diplomacy theory. The results shows that this cooperation positively impacts Indonesia's economic growth, especially in terms of increased employment, human resource development, and infrastructure development. However, it also presents new challenges on environmental issues. Indonesia's endeavors to address environmental problems stemming from the nickel industry involve pressuring China, as an investor, to uphold environmental standards within the mining areas.

Keywords: Cooperation, Indonesia, China, Nickel, Environmental

INTRODUCTION

Diplomatic relations between Indonesia and China have spanned more than seventy years. Official cooperation between two countries commenced in 1950, during President Soekarno's tenure, and has persisted through the leadership of President Joko Widodo. Over this extensive period, the dynamics of these two relationships have evolved into a notably complex interplay. Despite maintaining friendly relations, the two countries often encounter various challenges that necessitate addressing to fully describe the dynamics of their relationship (Utami, 2015). However, these challenges can be effectively addressed through cooperation, evident in the various agreements reached by both countries. Indonesia and China's relations have significantly progressed over the past decade, marked by increased cooperation across all aspects through the comprehensive strategic partnership (Putri & Ma'arif, 2019), aimed at improving the welfare of the people in both countries. Indonesia's economic relationship with China as a significant trading partner and investment source is increasing with the Indonesian government's efforts to accelerate

and expand the Master plan for the Acceleration and Expansion of the Indonesia's to promote an inclusive economic growth rate in Indonesia (Susanto, 2022). One of the sectors that is in the spotlight today is the mining sector.

This is supported by Indonesia's abundant natural resource potential, especially in the mining sector (Sitompul & Haka, 2020). Indonesia's significant natural resource potential in mining presents ample opportunities to bolster the national economy's growth rate, particularly in nickel commodities. Indonesia holds top position as the world's most significant nickel ore producer, accounting for 1.600.000 metric tons, or roughly 48.48% of global nickel production (U.S. Geological Survey, 2023). Nickel stands as a highly promising commodity for enhancing the national economy. Being the world's largest nickel-producing country, with 52% of the total global nickel reserves, presents a significant opportunity to bolster Indonesia's economy. Moreover, the annual global demand for nickel continues to grow. Its influence on commodity price cycles is profitable due to the substantial influx of foreign exchange earnings it generates. This usage is due to the increasing demand for nickel every year, particularly in the raw materials of the manufacturing and automotive industries used as materials for lithium batteries in electric vehicles (Winona, 2022). The increase in global nickel demand is driven by the increasing trend of EV (Electric Vehicle) battery usage, which supports energy transition growth and lowers global emission targets. This will cause global nickel demand to increase every year; according to LME (London Metal Exchange) data, in 2022, global nickel demand was 4.2 million tons, and it is predicted that this amount will increase to 6.2 million tons by 2030 (Adrianto, 2022).

According to a report by the Indonesian Central Statistical Office, the target country for nickel exports was China, worth US$4.49 billion; Japan, US$ 1.24 billion; and South Korea, US$ 106.99 million (Monavia, 2023). However, with abundant nickel commodities, Indonesia has not been able to optimize them for public welfare, which can affect the economic growth rate. The absence of nickel optimization in Indonesia stems from extensive crude nickel export activities, which eliminate maximum profit opportunities rather than prioritizing nickel processing beforehand (Agung & Adi, 2022). To address this, Indonesia has implemented a downstream policy aimed at boosting economic growth by halting crude nickel exports. However, a significant challenge in implementing downstream initiatives lies in the insufficient infrastructure and technology for nickel processing and refining. As a global nickel producer (U.S Geological Survey, 2023), Indonesia can effectively cater to China's demand across diverse industries, including stainless steel, electronics, rechargeable batteries, healthcare, and more. Additionally, collaborating on nickel processing offers promising prospects for Indonesia's economic growth. Furthermore, the high nickel prices serve as evidence that this collaboration will be advantageous for national interest.

The three previous studies were divided into three categories: investment, mineral and coal policies, and electric vehicles. Firstly, optimizing nickel's potential is crucial for Indonesia's economic growth via exports and attracting foreign investments (Agung & Adi, 2022). Prolonged nickel usage poses the risks depleting reserves, prompting Indonesia's government to issue Ministerial Regulation ESDM No 11 of 2019. This regulation

prohibits the export of raw nickel ore to secure long-term resources, thereby requiring domestic smelting and downstream processing to enhance national prosperity (Agung & Adi, 2022). Secondly, it reveals that the Indonesian mining sector failed to boost the country's income owing to various technical and financial challenge. As a result, the article presents several recommendations, two of which emphasize the necessity for the government to prioritize the establishment of the Mineral and Energy Law and impose requirements for companies to build smelters (Ika, 2017). Thirdly, Indonesia's capability to develop electric vehicles is based on its abundant nickel resources, among other factors. However, several obstacles hinder this progress, including high cost of manufacturing electric vehicle batteries, the absence of Indonesian standards, and the lack of supportive power generation infrastructure (Sidabutar, 2020).

Each study above underlined nickel's potential to augment investment and state revenue within established policies. This research, however, meticulously examines the repercussions of Indonesia-China cooperation within the nickel industry on the country's economic expansion. Therefore, drawing from the background, the primary focus of this research is to analyze the impact of the Indonesian and Chinese governments' cooperation in the nickel processing industry. The study aims to assess the substantial benefits derived from this cooperation in enhancing Indonesia's economy. Furthermore, it seeks to examine whether Indonesia's collaboration with China in the nickel industry offers solution to the environmental challenge encountered.

METHOD AND THEORY

This study used a qualitative method to assess the impact of cooperation between Indonesia and China in the nickel industry on Indonesia's economic growth and environmental challenge encountered. The data presented in this research comprises both qualitative and quantitative collected from books, official websites, journals and articles. In addition, data on Indonesian nickel investment opportunities were obtained from the official website of the Ministry of Energy and Mineral Resources.

The study was theoretically analyzed through the lens of economic diplomacy, focusing on the relationship between Indonesia and China in the global nickel trade. According to (Rana, 2007) the theory of economic diplomacy represents a state's various economic domains such as trade, investment, and other highly profitable exchanges. Economic diplomacy extends beyond solely concerning on economic activities; it also addresses economic issues and structures. It is a tool of political interest to achieve a certain goal of every country. The high level of independence between countries in the international political system causes the emergence of cooperative interactions to maximize their national interests. International cooperation is based on adjusting the needs of each actor in response to a problem so that they can achieve common interests. International cooperation is needed for various types of international and regional issues that require attention from various parties. As Lee and Hocking (2010) stated, the primary role of diplomatic actors is to create and manage an interdependent international economic climate. For instances, countries become interconnected in seeking alternative solutions

to prevailing issues by establishing agreements that satisfy all involved parties. In this study, we argue that bilateral cooperation between Indonesia and China in the global nickel trade, both of countries exhibit complementary efforts aimed at achieve their interests. This includes bolstering the welfare of their respective populations while fostering a mor conducive environment for transitioning towards renewable energy. This is because Indonesia is still facing various problems regarding the downstream program; hence, cooperation with China is necessary to ensure the program objectives.

Economic diplomacy plays a pivotal role as a tool in international relations, operating on the premise that mutual economic interests bolster one another (Okano-Heijmans, 2011). If the Indonesian government can strike a balance between its interests and foreign policy strategy by recognizing the potential of other countries, it will be beneficial. Indonesia's economic diplomacy with China is basically driven by several factors such as diplomatic relations between Indonesia and China that have been running for more than 70 years. Trade relations are mutually beneficial because Indonesia has abundant natural resources, while China master's technology and markets. In addition, China is a country known as an energy center, ranging from technology, infrastructure to the quality of human resources is very much compared to what Indonesia has. By conducting economic diplomacy with China, this is expected to help Indonesia in facing all challenges of the nickel downstream policy. This economic diplomacy can improve bilateral relations that have a positive impact on Chinese investment in supporting the nickel industry in Indonesia.

As Holsti (1992) stated, there several reasons that prompt a country to cooperate with another country. First, to improve economic welfare. In this context, Indonesia-China cooperations can reduce the costs that must be borne in improving infrastructure development and community empowerment to support downstream programs in its country. Meanwhile, China will be easier to get the nickel supply needed in various industries. In addition, the second reason is to reduce the losses caused by individual countries' actions that have an impact on other countries. Through the downstream policy, the Indonesian government's ban on exporting raw nickel has raised concerns among certain European countries. Downstream policies continue to encounter numerous challenges, particularly in infrastructure and technology. Failure to collaborate with other countries, notably China, poses a significant obstacle (Tritto, 2023). Therefore, bilateral cooperation in the nickel industry between Indonesia and China is mutually beneficial to both countries. It encompasses diplomatic, trade, economic, political, and educational aspects (Dewani, 2023). According to Rana (2007) bilateral diplomacy primarily focuses on a country advancing its national interest to attain maximum benefits, achieved through fostering strong and enduring relationships between countries (Rana, 2007). This aligns with the cooperations rooted in China's demand for substantial nickel reserves and Indonesia's absence from the global nickel market.

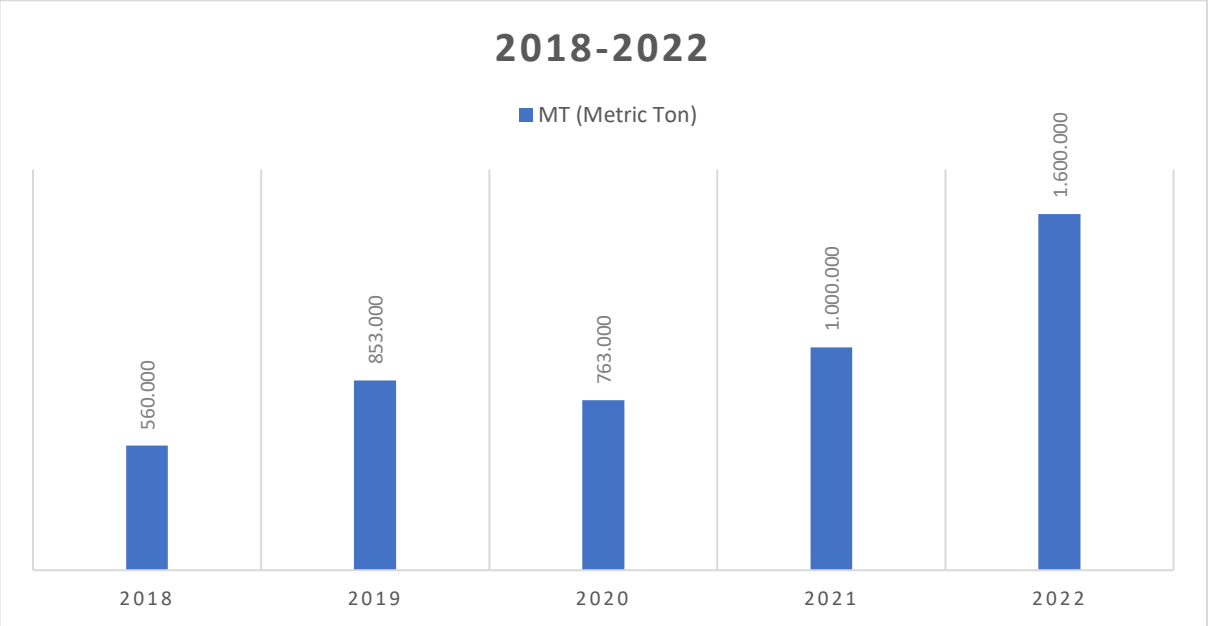
RESULT AND ANALYSIS

Indonesian Nickel Potential

Nickel has excellent potential in the energy industry, where it is the primary material for manufacturing lithium-ion batteries used in electric vehicles (M. Brunner, 2021). Electric vehicles are becoming a trend today in promoting the energy transition from fossil-fuel vehicles to more environmentally friendly ones. This will undoubtedly positively impact reducing dependence on fossil fuels and greenhouse gas emissions. The use of EV batteries to transition energy to sustainable mobility has become a severe concern for governments, industries, and communities worldwide. As an essential component in the production of electric vehicles, nickel commodities can promote energy change and utilization. This impacts global nickel demand, which is expected to continue to increase with technological growth and awareness of the importance of clean and sustainable energy use. Based on data (U.S Geological Survey, 2023), Indonesia is the world's largest nickel producer, with nickel production in 2022 of 1,600,000 metric tons.

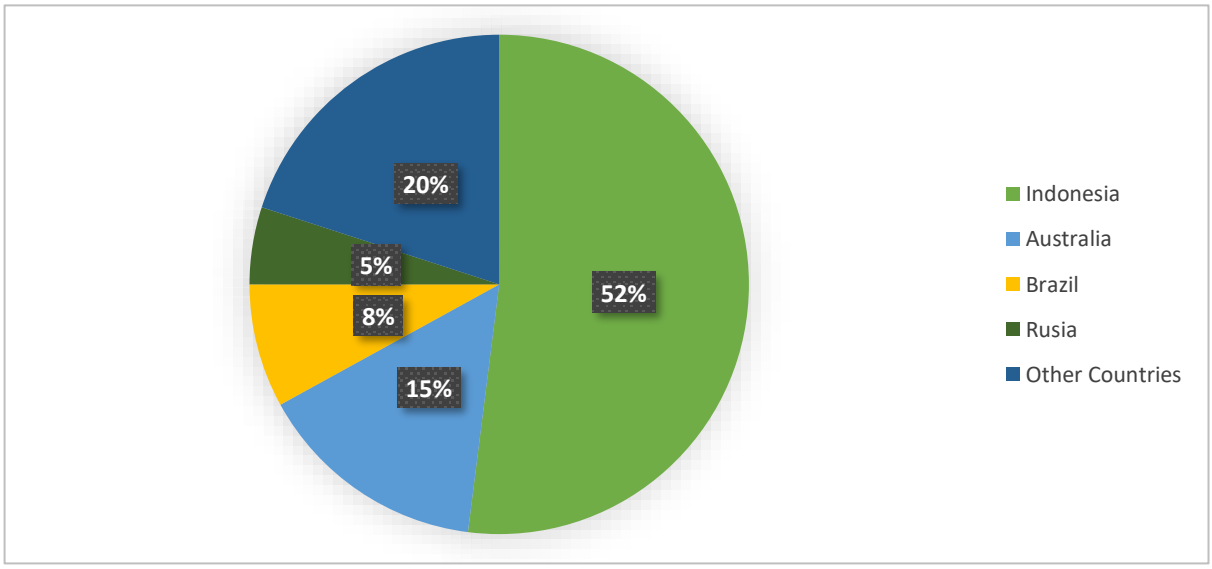
The figure 1 displays a general upward trend. However, the past five years have not seen consistent growth. Specifically, there was a decline in nickel production by 90.000 metrics tons between 2019 and 2020 (U.S. Geological Survey, 2021). A significant factor contributing to the decline on nickel production was the impact of the covid-19 pandemic, which hindered nickel production (Kasnadi, 2021). Nevertheless, from 2020 to 2021, nickel production rebounded, experiencing an increase of 237.000 metric tons (U.S. Geological Survey, 2022). The peak in Indonesia nickel production in 2021-2022 surged by 600.000 metric tons, solidifying Indonesia as the world's largest producer, far surpassing other countries with 440.000 metric tons, the Philippines 330.000 metric tons, and Rusia 220.000 metric tons. Additionally, according to Indonesian Ministry of Energy and Mineral Resources, Indonesia's nickel reserves have reached 72 million tons, encompassing nickel limonite and low-grade nickel. This constitutes 52% of the world's total nickel reserves, which stand at 139.419.000 tons.

Figure 1. Indonesian nickel production



Source: Ministry of Energy and Mineral Resources of the Republic of Indonesia (2020)

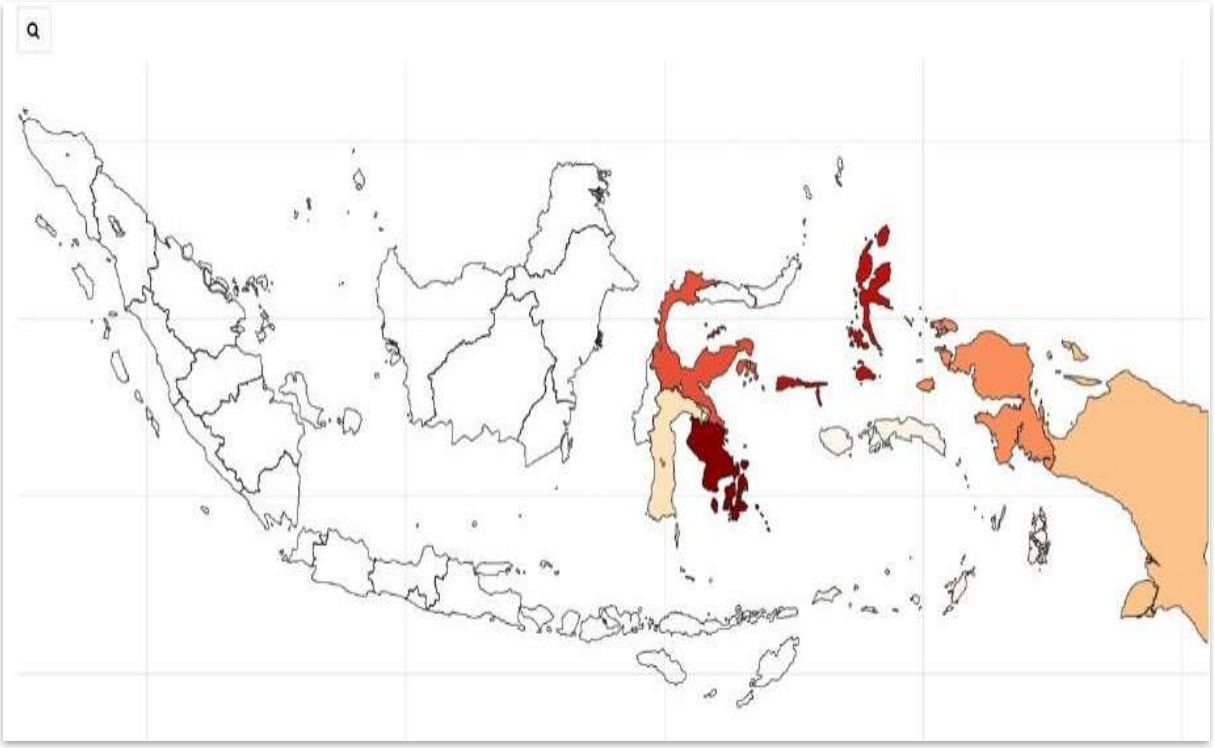
Figure 2. Nickel Reserves in The World



Source: Ministry of Energy and Mineral Resources of the Republic of Indonesia (2020)

The figure 2 shows Indonesia as a holding the world's largest nickel reserve share at 52%. The second position is held by a collective of countries, including the Philippines, China, and Canada, accounting for 20%. Australia secures the third position with a nickel reserve share of 15%, followed by Brazil in fourth place at 8%. Rounding out the top five is Russia, with 5% of the world's nickel reserves.

Figure 3. A Map of Nickel Distribution in Indonesia



Source: Ministry of Energy and Mineral Resources of the Republic of Indonesia (2020)

As per the Ministry of Energy and Mineral Resources, Indonesia possesses a nickel mining area spanning 520,877.07 hectares spread across seven provinces (figure 3): Southeast Sulawesi, South Sulawesi, Central Sulawesi, North Maluku, Papua, and West Papua. Among these, Sulawesi stands as the primary hub for nickel resources, with Southeast Sulawesi being the largest nickel mining area in Indonesia. The following table delineates the nickel mining areas across each province in Indonesia (Kementerian ESDM, 2020).

Table 1. Nickel Mining Area Table in Indonesia

No	Province	Amount of Mining Area (ha)
1.	Southeast Sulawesi	198.624,66
2.	South Sulawesi	198.624,66
3.	North Maluku	156.197,04
4.	Central Sulawesi	115.397,37
5.	West Papua	22.636
6.	Papua	16.470
7.	Maluku	4.389

Source: Ministry of Energy and Mineral Resources of the Republic of Indonesia (2020)

As the world's largest nickel producer and reserve, Indonesia plays an important role in the global nickel market. Global demand for Indonesian nickel continues to increase with technological growth, especially in the energy industry. The use of nickel in the manufacture of EV batteries will affect the increase in global demand (Adrianto, 2021), which in 2040 is estimated to account for 30% of total nickel consumption. In 2040, this demand is estimated to represent 30% of the total nickel consumption, motivating Indonesia to optimize its nickel potential as a means of fostering economic growth.

Indonesia implemented a downstream policy via the Minister of Energy and Mineral Resources Regulation No. 11 of 2019. This policy included a ban on nickel ore exports, which eventually led to a dispute with European Union. However, Indonesia ultimately lost the lawsuit at the World Trade Organization (WTO) (Dwi, 2023). Indonesia remains committed to continuing its downstream policy as part of its efforts to bolster economic growth. Since the implementation of this policy in 2022, revenues from the nickel sector have surged by US$33 billion, a stark increase from the previous range of only US$1.1 billion (Binekasri, 2023). However, Indonesia's downstream nickel initiatives still confront several challenges, including inadequate infrastructure, technology deficiencies, and a shortage of skilled professionals. Collaborating with China presents an effective solution to address these hurdles. Partnership with other countries can facilitate technology transfer, enhance expertise within the workforce, and invest in developing essential infrastructure. Such collaborations are poised to significantly accelerate Indonesia's downstream policy, thereby fostering positive impacts on economic growth.

Indonesia-China Cooperation in the Nickel Industry

In the era of President Joko Widodo, Indonesia and China's diplomatic relations have become more robust and expanded to various areas such as politics, economy, and security.

This increasingly close relationship is also based on China's position as a country with significant influence in multiple aspects such as finance, security, military, and politics (Munatama & Zhaidah, 2023). The Belt and Road Initiative program also supported this collaboration, which aims to connect global connectivity. This is also an opportunity for Indonesia because it is aligned with Indonesia's desire to improve its economic sector by entering trade investment. For Indonesia, China is a country that has the power to realize its interests. Likewise, Indonesia has a strategic geographical and demographic location for China, making it a potential production market (Soviyaningsih, 2019).

During the Jokowi administration, the Indonesian Government had an ambitious target of building 53 smelters planned to be completed in 2024 (Santika, 2023). However, the Government, in this case, the Ministry of Energy and Mineral Resources (ESDM), revealed that the total number of raw mineral refining and processing facilities (smelters), especially for nickel commodities in Indonesia, both those already operating, still under construction, and those wishing to be built, has accumulated to reach 116 smelters. This is also supported by the dominant investment from China entering the nickel industry as a form of cooperation (Firda Dwi Muliawati, 2023). This aligns with the Indonesian Government's target in implementing downstream policies, namely by building smelters in mining areas. The investment assistance from China accelerates the development of smelters that support the success of the nickel industry in Indonesia (Agung & Adi, 2022). The energy issue is one of the focal points of the increased cooperation between these two countries, which are in the economic recovery stage after the covid-19 pandemic. The nickel industry is an example of strategic cooperation in the energy sector, which previously positively impacted the increase in Chinese investment in Indonesia (Cristina et al., 2022). However, on the other hand, it is worth noting that the investment creates local jobs, applies technology transfers, brings benefits to residents, maintains environmental sustainability, and contributes to national economic growth.

Bilateral cooperation is cooperation undertaken by only two countries (Prameswari, 2018), where this relationship is the foundation of international relations and plays a role in advancing national interests (Setiawan et al., 2022) for both countries. In an effort to improve relations between the two countries, Indonesia and China often engage in many cooperations in which they have their connections and attractions. With an understanding of bilateral concepts, bilateral cooperation is also used to establish cooperation in both political and economic fields. Indonesia, as a country with various commodities of resources, tries to continue to increase its economic growth to create the welfare of the people. To achieve this target, Indonesia needs foreign aid in investment and development, and one of the countries that has established diplomatic relations with Indonesia is China. Indonesia needs China's help in developing the nickel industry. Its main focus is in the form of investment. Besides, not because of the proximity of relations between Indonesia and China, this investment aid policy is needed from China because it is the main actor in this industry. This makes China very good at nickel management, supported by capable technology and infrastructure (Joharsoyo dan Hidayat, 2023). This aid is felt to be sufficient when the government's target for building smelters has been met. Currently, the Indonesian government is targeting building 53 smelters by 2024, but only 19 smelters

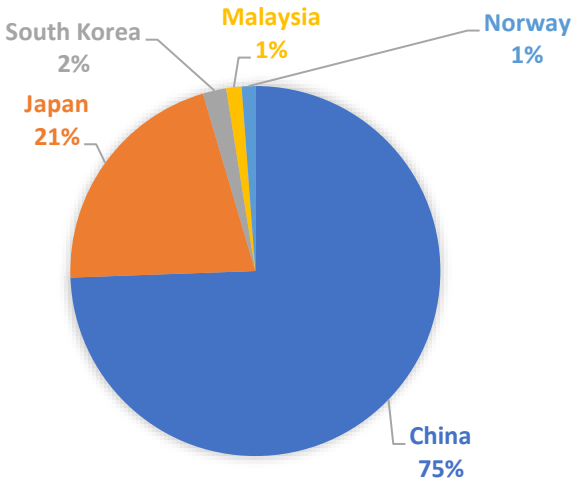
have been realized. Of course, with investment assistance from China, it can accelerate the development of smelters that support the success of the nickel industry in Indonesia (Agung & Adi, 2022).

Indonesia-China cooperative relations, established for over seventy years, have had their share of fluctuation and variations over time. Nevertheless, to date, both countries have managed to sustain a cooperative relationship that remains mutually beneficial. Reflecting on the historical relations between the two countries on preceding years, Indonesia and China encountered periods where cooperation ceased, yet they eventually resumed collaboration, elevating it to a comprehensive strategic level. There are several reasons why China prioritize Indonesia as a strategic partner. Firstly, Indonesia's role in the Southeast Asian region can stimulate growth and economic revitalization at both regional and national levels. Secondly, Indonesia presents a highly promising market for China. Thirdly, Indonesia's economic growth is rapid. Conversely, China plats a crucial role in Indonesia's economy, particularly in investments and trade relations Additionally, China's success in implementing policies that significantly impact the global economy has positioned it as Indonesia's most strategically important trading partner (Tri Andika & Nur Aisyah, 2017).

In every cooperation between countries, each has a role and its own interest. In order to achieve these interests, the state naturally engage in a process of interaction, activities, and activities, building mutual influence to fulfill their respective national interests (Zakiyya & Purnama, 2022). As a developing country Indonesia, has opened up broad opportunities for foreign countries to accommodate the processing of their resources, thereby increasing the value of these commodities. Simultaneously, China, as a superpower boasting a superior economy in Asia and recognized globally as the world's factory, plays a significant role in the dynamics of the global economy/ China has successfully entered various sectors in Indonesia, particularly in the economic sector (Amanda, 2021) carried out through international trade. In addition, international trade has also been one way to strengthen one country's relationship with another (Santoso, 2017), similar to Indonesia and China, which have been working on cooperation in the form of trade in nickel raw materials.

Mining stands as one of the critical sectors supporting the country's economic growth. Drawing from previous discussion regarding the availability of substantial Indonesian nickel reserves and production figures, it becomes evident that Indonesia possesses exceptional capacity in nickel raw materials. This capacity can be optimized to meet the escalating global demand year after year. The rise continues to be driven by the soaring demands of forward-thinking foreign consumers in advancing their manufacturing and automotive industries, exemplified by countries like China, Japan, and South Korea.

Figure 4. Destination Countries for Indonesian Nickel Export (January – November)



Source: Data processed from the Central Statistical Office (Kusnandar, 2023)

The diagram pie figure 4 illustrates that three primary Indonesian nickel consumers are East Asian countries, which significantly contribute to the industrial sector. Nickel plays a crucial role in meeting various industrial needs. However, China remains the foremost consumer, exhibiting the highest demand for Indonesian nickel. This is attributed to China's rapid industrialization and its receptiveness to opportunities for economic growth, including investment in countries seeking China's role and assistance in pursuing their national interest. Beyond China, emphasis has been placed on the superiority of Indonesian nickel, forming the foundation of substantial global demand for these resources. In a bid to maximize its nickel potential, Indonesia has enacted downstream policy.

Following the downstream policies, which mandated a government ban on raw nickel ore exports, all mining companies were required to establish smelters to process nickel into semi-finished goods. Subsequently, the country witnessed a further increase of nickel exports. The challenges in implementing this downstream policy encompass the substantial infrastructure costs and a shortage of skilled human resources. Consequently, bilateral cooperation both of countries emerges as an ideal solution to tackle the challenges.

The Impact of Indonesia-China Cooperations on Employment

The cooperation in the nickel industry between Indonesia and China has significantly contributed to Indonesia's economic growth. The presence of Chinese foreign companies in Indonesia is poised to create substantial job opportunities, particularly enhancing the welfare of the people. According to Aljauhar (2016), the presence of nickel mining in Kabaena Island, Southeast Sulawesi has positively affected the welfare of the local community. This evident is supported by a significant increase of variables used to

measure respondents' welfare. This increase affected 15.06% of the workforce in the West Kabaena Subdistrict, Southeast Sulawesi, which was absorbed by nickel mining companies (Aljauhar, 2016).

In addition, based on the report (Kementerian ESDM, 2020) shows that the construction of smelters and nickel mines will increase the opportunity to work annually. As of 2019, nickel smelter development has opened jobs for 21,266 people, comprising 87% local and 13% foreign workers. This is also supported by long-term projects by PT Vale Indonesia Tbk and PT Bahodopi Nickel Smelting Indonesia on constructing low-carbon nickel mining and processing projects in Morowali Regency, Central Sulawesi. Based on (Limanseto, 2023), this green smelter project will increase employment for the local community, which during the construction period is expected to absorb 12,000 to 15,000 workers. While entering operational life, the project will require 3,000 workers.

As for some of the reasons why Chinese companies prefer local workers. Firstly, employing a local workforce significantly reduces production costs, leading to increased profitability compared to hiring skilled labor from outside the region. Additionally, local employees possess valuable knowledge and familiarity with the mining area, facilitating compliance with local government regulations and policies for foreign enterprises. Lastly, it fulfills social responsibilities by providing job opportunities to the local population, contributing to the regional economic growth. This positive impact on both economy and the welfare of the community is expected to create a ripple effect within the nickel industry development in Morowali, Central Sulawesi. The strategic nickel potential of Sulawesi Island further emphasizes the importance of optimizing local nickel processing to bolster Indonesia's overall economic growth.

Development of Human Resource Quality

The collaboration between Indonesia and China is posed to enhance the skills of human resources. One of the challenges of downstream policy is the lack of quality human resources, especially in mastering advanced technologies. This encourages foreign companies to hire outside expert workers. Nevertheless, these companies will also offer training to local workers to align them with industry requirements. Local labor has gained advantages and benefits for foreign companies, particularly those from China. The training for local workers was also supported by Indonesian Minister of Economic Coordinator, urging corporations to send numerous young individuals to Sulawesi for education and training, preparing them for future roles in nickel companies. Through this training, local workers will acquire knowledge and experience in nickel processing. Skilled workers will transfer technology to local workforces.

An initiative aimed at expediting the technology transfer process involves providing training to local workers outside the region, enhancing their skills in accordance with the specific requirements of the company (Yasin et al., 2021). In 2019, the resulting Community Development and Empowerment Program reached 100 billion rupiahs or US$6.7 billion based on the report (Kementerian ESDM, 2020). One example of the company implementing the training is PT Indonesia Weda Bay Industrial Park (IWIP),

located in North Maluku. PT IWIP conducts various training for local workers, such as using heavy equipment, wheel loaders, dump trucks, and welder. PT IWIP is a company founded by three Chinese investors, Tsingshan Company, Huayou, and Zhenshi (Kemenperin RI, 2018), which in 2019-2022 conducted training with a total of 17,358 participants (Indonesia Weda Bay Industrial Park, 2022). The development of the quality of human resources supported with adequate infrastructure development will help the process of running downstream nickel in Indonesia. The downstream policy certainly helped increase Indonesia's state income and economic growth. Thus, it can have a good impact on the welfare of the Indonesian people.

Infrastructure Development

The impact of Indonesia-China cooperation on nickel trade also had a tremendous impact on infrastructure development. Initially, China encountered challenges fulfilling its demand for Indonesian nickel as raw material. Nevertheless, leveraging its capabilities, China made substantial investments and initiated the re-establishment of mutual cooperation between the two nations. Under the policy banning the export of raw nickel ores, Indonesia mandated all mining companies to construct smelters and engage in downstream activities. This directive significantly boosted smelter development within Indonesia, serving as pivotal facilities for processing nickel ores before exportation. Additionally, this collaboration fostered the creation of essential infrastructure such as airports, ports, and roads in mining areas. The data from the Ministry of Energy and Mineral Resources of the Republic of Indonesia highlight several developments, as detailed in the following table:

Table 2. Development of Nickel Infrastructure in Indonesia

Form Development	**Region Morowali Industry (Morowali, Sulawesi Tengah)**	**Region Konawe Industry (Konawe, Sulawesi Tenggara)**	**Region Bantaeng Industry (Bantaeng, Sulawesi Selatan)**	**Region Weda Bay Industry (Halteng, Maluku Utara)**
Industry	Integrated Industry Ferronickel, Stainless Steel and Batteries Vehicle Electricity	Integrated Industri Ferronickel, Stainless Steel and downstream product	Industry Ferronickel and Stainless Steel	Integrated Industri Ferronickel, Stainless Steel and Batteries Vehicle Electricity
Airport	Maleo Airport, Morowali	Haluoleo Airport, Kendari	Sultan Airport Hasanuddin, Makassar	Sultan Babullah Airport, Ternate
Port	Jetty Port with the region	Jetty Port with the region	Pantoloan Port	6 Jetty Port for Factory, PLTU 1x250 MW, Fuel Oil Port
Road Cross	Road Cross Kendari-Morowali-	Trans Road Sulawesi Kendaro-	Trans Road Sulawesi Makassar-	Cross Road Sofifi-Weda-Gebe

	Palu-Mamuju-Makassar	Konawe-Morowali-Palu	Bantaeng-Bulukamba

Source: Ministry of Energy and Mineral Resources of the Republic of Indonesia (2020)

Infrastructure development in the nickel industry can positively impact Indonesia by increasing the attractiveness of foreign investors. In 2019, the value of the foreign investment in the nickel smelter base metal industry reached US$814 million (Kementerian ESDM, 2020). This means that references to the value of foreign investment in the nickel industry indicate significant foreign interest in the Indonesian nickel sector. Increasing infrastructure development can increase the appeal of foreign investors looking for stability and good infrastructure to support transportation mobility. Therefore, infrastructure development will undoubtedly have a good impact on providing benefits to the Indonesian economy.

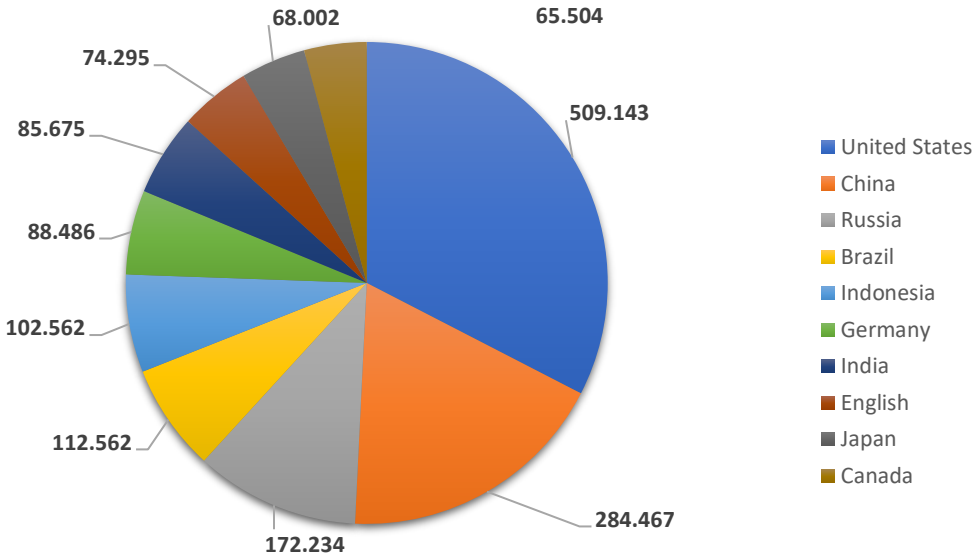
Challenge on Environmental Issues

Previously, three positive effects of Indonesia-China cooperation in the nickel industry significantly contributed to Indonesia's economic growth. However, certain concerns demand serious attention, particularly to the environment. The expansion of nickel mining in Indonesia, brings side effects in the form of environmental degradation. In 2022, Indonesia's nickel mining area spanned 1,037,435.22 hectares, with 765,237.07 situated in forested areas (Wicaksono, 2023). It expands deforestation in Indonesia and lead to environmental pollution i.e., (1) in certain areas, such as East Halmahera, open nickel ore mining has led to a decrease in water quality, primarily caused by the toxic nickel metal waste into the water through the river. This contamination affects the fish, compromising their safety and suitability for consumption. Polluted water bodies containing harmful substance can force fish habitats to migrate to uncontaminated areas (Sarianto et al., 2016); (2) other nickel mining areas also adversely affect soil fertility. A study conducted (MIustafa et al., 2022) on the post-mine land of PT Bumi Konawe Abadi Southeast Sulawesi revealed that the soil mixed with mining materials exhibits low fertility. It displays characteristic such as low pH, C-Organic, and phosphorus levels, as well as insufficient total nitrogen; (3) another company, PT. Waja Inti Lestari, operating in the Lapapao block of Babarina village, has conducted mining exploration resulting in water pollution and disruption of the coastal ecosystem. This is due to the discharge of mining materials into the sear, affecting the second largest seaweed-producing area in Southeast Sulawesi. The disruption of the marine ecosystem in the area poses a threat as it can damage the potential resources (Agussalim et al., 2023); (4) the coral reef habitat in Morowali Waterways faces a threat from nickel waste, which harms the reefs. The disposal of tailing waste, consisting of rocks, chemicals, and elements, can become toxic when exposed to water or air, swiftly causing damage to habitats and reefs (Syarifuddin, 2022).

Observing the escalating environmental degradation caused by mining activities, the Indonesian government has made efforts to mitigate the impact by implementing regulations and promoting the production of electric vehicles. With the growing environmental damage caused by nickel mining, Indonesia has taken steps to mitigate

environmental degradation in line with its vision to achieve zero greenhouse gas emissions by 2060. However, this vision faces setbacks due to the worsening impact of climate change, marked by rising carbon emissions originating from the combustion of carbon-containing compounds like LPG gas, gasoline, and diesel. Additionally, the use of other fuels contributes to global warming, resulting in increased Earth temperatures. Indonesia, ranking fifth among the world's largest gas emitters in 2021, grapples with this challenge.

Figure 5. Emission Gas Contributing Countries in 2021

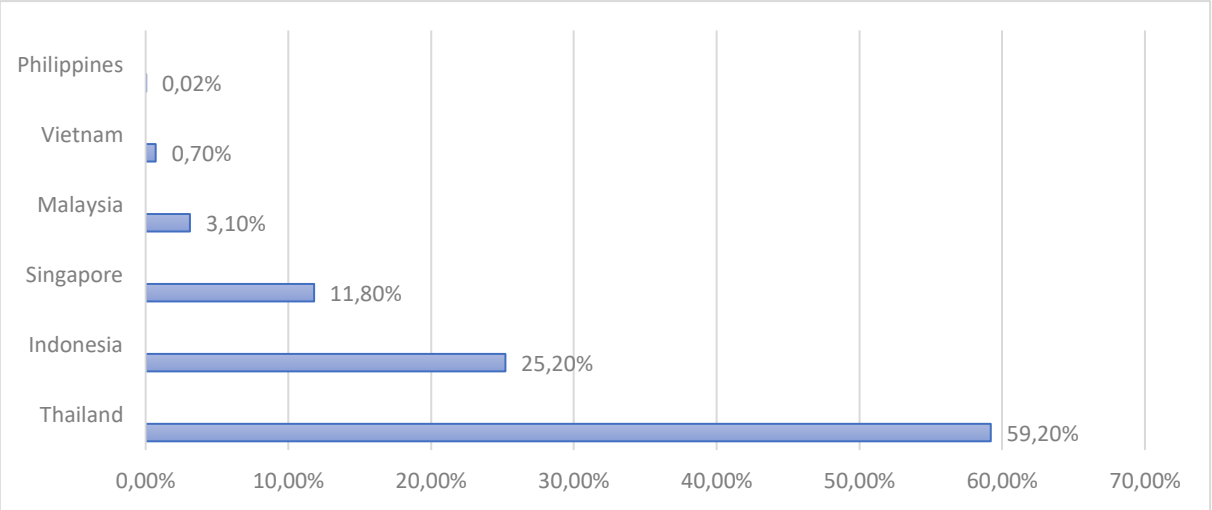


Source: Carbon Brief 2020 (Mutia, 2022)

Referring to the figure 5, various countries are trying to reduce carbon emission gas by starting to enter the world of energy transition using more environmentally friendly technological advances. From this data, it's evident that both Indonesia and China belong to the category of countries with high carbon emissions. To tackle this issue, several countries, including Indonesia and China, have initiated an entry into the world of energy transition by adopting more environmentally friendly technological advancements. This serves as one solution to reduce carbon emission gas production. Among these efforts is the reduction of fossil energy usage in favor of electrical energy, particularly through the development of electric vehicles. Nickel plays a pivotal role as a raw material for batteries, significantly contributing to this energy shift due to its exceptional energy storage capabilities. Electric cars predominantly rely on lithium batteries, which are a downstream product of the nickel industry (Sidabutar, 2020).

Moreover, developments in electric vehicle technology provide multiple advantages over conventional cars. These vehicles play a central role in reducing greenhouse gas emissions and lowering CO2 intensity. Alongside their environmental benefits, electric cars also make a substantial economic contribution. As shown in the diagram below, Indonesia ranks second in the ASEAN region for the increase in electric car production in 2022.

Figure 6. Electric Vehicle Sales ASEAN Countries 2022



Source: Counterpoint Global Passenger Electric Vehicle Model Sales Tracker 2022, (Counterpoint, 2022)

The figure 6 illustrates that Thailand leads with 59.20%, securing the first position, followed by Indonesia at 25.20%, placing second. This statistic raises concerns as Indonesia, the world's largest nickel producer, trails behind Thailand, a country without significant nickel resources. It poses a threat to Indonesia's ambitions of becoming the primary hub for the global electric car industry, despite being the largest market in ASEAN. Thailand maintains its lead in electric vehicle growth, attributed to its policy protecting the automotive industry, which serves as an attractive incentive for foreign investors (Sidabutar, 2020). Nickel serves as a crucial factor in supporting energy transition efforts. Beyond electric cars, which reduce emissions and CO2 intensity, Solar Power Plants utilizing nickel-based batteries play a significant role. Indonesia's equatorial location with high solar intensity around 4.8 KWh/m2 or 112,000 GWp facilitates PLTS implementation. Indonesia harnesses this potential in nickel processing, collaborating with foreign investors like Tsingshan Holding Group. Tsingshan plans to establish a 2000 MW clean energy facility by 2026 in Central Halmahera and North Maluku, constructing solar and wind power plants facilities (Ariyani, 2021).

The construction is intended to provide electricity for companies producing raw materials used in manufacturing batteries for electric vehicles. The Tsingshan company also intends to build a 5,000 MW hydroelectric power plant project in Indonesia to ensure a clean energy supply. This initiative will undoubtedly aid in ensuring that electric vehicle operations run without emitting carbon dioxide. Hence, the collaborative efforts of Indonesia and China in the nickel industry to establish eco-friendly energy sources are hoped to address the environmental challenges stemming from the mining process. With collaboration between the Indonesian Government and Chinese companies, it is expected to have a better impact on the environment. This is also supported by the Indonesian government regulations that emphasize foreign companies to be able to pay more attention to the environment in the Mining Environment Protection Regulation written in Law No.32 of 2009 concerning Environmental Permission and Other Support Permission, Law

No.3 of 2020 concerning Reclamation and Post-Mines, and Law No. 41 of 1999 concerning the permit to use forest areas (Kementerian ESDM, 2020).

This collaboration between Indonesia and China also seeks to implement Law No.32 of 2009 by carrying out an energy transition, namely by accelerating the production of electric vehicles. In Indonesia, these electric vehicles have also been regulated in the Presidential Regulation concerning the Acceleration of the Battery-Based Electric Motor Vehicle Program for Road Transportation (Nur & Kurniawan, 2021). The aim is as an effort to improve the climate in Indonesia (Sukma Aisya, 2019). In addition, on February 10, 2023, the Coordinating Ministry for Economy inaugurated the Construction of Low Carbon Nickel Mining and Processing Projects between Vale Indonesia company and Bahodopi Nickel Smelting Indonesia company. The project uses Rotary Kiln Electric Furnace or RKEF technology supported by natural gas sources, thus reducing carbon emissions from the project's overall operations by 33% by 2030. The project was the first green smelter plant with green mining, energy, and product concepts (Limanseto, 2023). In addition, this project also implemented a green economy to increase people's social welfare and equality while reducing the risk of environmental damage caused by mining activities. Mining activities have a vital influence on environmental pollution; in addressing this problem, China was one of the first countries to advance the concept of green mining with sustainable mining development (Yu et al., 2022). The implementation of green mining has areas of environmental management that must be considered, such as managing water waste, air waste, toxic waste, and maintaining ecosystem balance. Thus, cooperation with China in the nickel industry is expected to help Indonesia solve the environmental problems of mining operations.

CONCLUSIONS

Based on the outlined discussion, we conclude that Indonesia-China's cooperation with the nickel industry significantly impacts Indonesia's economic growth. Notably, the Indonesian government's efforts to increase economic growth were also found after the emergence of downstream nation policies by stopping crude nickel exports. Nickel mining is one of the most potential commodities to contribute to increased state income. This attracted the attention of China to be able to cooperate in the form of large-scale investments in Indonesia. From this study, there were also factors underlying the establishment of Indonesia-China cooperation, such as the availability of abundant nickel resources in Indonesia, the increasing number of Chinese needs for Indonesian nickel as a material for its industrialization process, The Indonesian government's policy of increasing nickel added, and Indonesia's desire to increase foreign investment.

The presence of Chinese foreign companies in Indonesia, of course, will open jobs for local labor and improve the welfare of the people. This is strengthened by the power of local people with more knowledge and experience about the area to assist companies in meeting local government regulations and policies. Then, with the increase in employment, this can help develop the quality of human resources by conducting training activities for workers so that people can adapt to the needs of the industry. Nevertheless,

it is undeniable that the increasing expansion of nickel mining also has an environmental degradation effect. This is then a challenge for the Indonesian government to balance its environment. Lastly, this cooperation also affects the creation of various accessibility and infrastructure development such as airports, ports, and crossroads around mining areas.

In addition, the impact of Indonesia-China cooperation on the nickel industry on economic growth also provides new challenges for the Indonesian government in managing nickel. The biggest challenge to this cooperation is the process of environmental conservation, as continuous mining can produce more waste, damage some parts of the ecosystem, and cause gas emissions that continue to trigger global warming. In this regard, the Indonesian government and Chinese companies have tried to reduce the risk of environmental damage by managing nickel using the concept of green mining. Indonesia and China's cooperation in the energy transition can also positively impact both countries. Efforts to build lithium battery factories also help realize Indonesia-China's vision of achieving net zero emission targets supported by PLTS development. This collaboration is also supported by Indonesian government regulations that emphasize foreign companies being able to pay more attention to the environment. Thus, it can be concluded that Indonesia-China cooperation in the Nickel Industry has a more positive impact on Indonesia's economic growth. Based on these conclusions, the hypothesis is that this policy will continue because Indonesia plans to downstream not only nickel commodities but also other commodities. After all, this cooperation can be mutually beneficial for both countries. In addition, future research can examine the impact of Indonesia-China cooperation on the nickel industry in other sectors such as environment, technology, and renewable energy.

REFERENCES

Adrianto, R. (2021) *Prospek Permintaan Masih Menjanjikan, Harga Nikel Melonjak* (online). Available: https://www.cnbcindonesia.com/market/20211012145800-17-283308/prospek-permintaan-masih-menjanjikan-harga-nikel-melonjak (Accesed: 20 Maret 2023).

Ashadi, W. (2022) "Kudeta Junta Militer Myanmar Terhadap Aung San Suu Kyi 2021", *Dauliyah Journal of Islamic and International Affairs*, 7(2), p. 138. Doi: https://doi.org/10.21111/dauliyah.v7i2.8503.

Adrianto, R. (2022) *Permintaan Nikel Bakal Tinggi Hingga 2030, Harganya Nanjak!* (online). Available at: https://www.cnbcindonesia.com/market/20220912165504-17-371437/permintaan-nikel-bakal-tinggi-hingga-2030-harganya-nanjak#:~:text=Harga%20Nikel%20US%24%2Fton&text=Vale%20mengatakan%20permintaan%20global%20untuk,pada%202022%2C%20dalam%20presentasi%20perusahaan (Accessed: 20 Maret 2023).

Agung, M. dan Adi, E.A.W. (2022) "Peningkatan Investasi Dan Hilirisasi Nikel Di Indonesia", *Jurnal Ilmu Sosial dan Pendidikan*, 6(2), pp. 4009–4020. Available at: https://doi.org/10.58258/jisip.v6i2.3085.

Agussalim, M.S., Ariana dan Saleh, R. (2023) "Kerusakan Lingkungan Akibat Pertambangan Nikel di Kabupaten Kolaka Melalui Pendekatan Politik Lingkungan,

Kerusakan", *Journal of Social Region Research*, 8(1), pp. 2527–3752. doi: https://doi.org/10.24256/pal.v8i1.3610.

Amanda, R. (2021) "Hegemoni Dibalik Hubungan Bilateral Tiongkok-Indonesia", *Pamator Journal*, 14(1), pp. 34–39. doi: https://doi.org/10.21107/pamator.v14i1.9004.

Binekasri, R. (2023) *Jokowi Mau RI Jadi Negara Maju: Kalah di WTO, Maju Terus!* (online). Available at: https://www.cnbcindonesia.com/news/20230201151245-4-410097/jokowi-mau-ri-jadi-negara-maju-kalah-di-wto-maju-terus (Accessed: 20 Maret 2023).

Cristina, M. (2022) "Manakah Yang Lebih Besar Untung Atau Ruginya Indonesia Menjalin Kerjasama Dengan China", *Jurnal Pendidikan Kewarganegaraan Undiksha*, 10, 3(3), pp. 277–284. doi: https://doi.org/https://doi.org/10.23887/jpku.v10i3.52034.

Counterpoint, T. (2022) *Thailand Leads Southeast Asia EV Market With 60% Share, Counterpoint* (Online). Available at: https://www.counterpointresearch.com/insights/sea-ev-sales-q3-2022/ (Accessed: 18 April 2023).

Dewani, N.S. (2023) "Analisis Diplomasi Minyak Indonesia Ke Italia," *Publicio: Jurnal Ilmiah Politik, Kebijakan dan Sosial*, 5(1), pp. 48–60. Available at: https://doi.org/10.51747/publicio.v5i1.1213.

ESDM, K. (2020) *Peluang Investasi Nikel Indonesia* (Online). Available at: https://www.esdm.go.id/assets/booklet/tambang-2020/Booklet-Nikel-FA.pdf (Accessed: 20 Maret 2023).

Holsti, K.J. (1992) *Politik Internasional Suatu Kerangka Analisis*. 1ed. Bandung: Binacipta.

Ika, S. (2017) "Kebijakan Hilirisasi Mineral: Policy Reform untuk Meningkatkan Penerimaan Negara," *Kajian Ekonomi dan Keuangan*, 1(1), hal. 42–67. Available at: https://doi.org/10.31685/kek.v1i1.259.

Irwansyah Aljauhar, E. a. (2016) "Pengaruh Aktivitas Pertambangan Nikel terhadap Daya Serap Tenaga Kerja dan Tingkat Kesejahteraan Masyarakat (Studi Kasus: Pulau Kabaena, Kab. Bombana, Sulawesi Tenggara)", Jurnal Wilayah dan Kota Maritim, 4(1), pp. 70–82.

Joharsoyo, Y.M. dan Hidayat, A.A.N. (2023) Jokowi Sebut Tensi Geopolitik Serba Dadakan: Enggak Ada Hujan, Tahu-Tahu Perang (online). Available at: https://bisnis.tempo.co/read/1803269/jokowi-sebut-tensi-geopolitik-serba-dadakan-enggak-ada-hujan-tahu-tahu-perang (Accessed: 30 November 2023).

Karnadi, A. (2021) *Produksi Bijih Nikel Menurun pada 2020* (online). Available at: https://dataindonesia.id/energi-sda/detail/produksi-bijih-nikel-menurun-pada-2020 (Accessed: 27 Mei 2023).

Kemenperin RI (2018) *Melihat Kepak Sayap Tsinghan Group. Kementrian Perindustrian Republik Indonesia* (online). Avalable at: https://kemenperin.go.id/artikel/19864/Melihat-Kepak-Sayap-Tsingshan-Group (Accessed: 20 Maret 2023).

Kusnandar, V.B. (2023) *Januari-November 2022, Nilai Ekspor Nikel Indonesia ke Tiongkok Tembus Rp60 Triliun* (online). Available at:

https://databoks.katadata.co.id/datapublish/2023/02/03/januari-november-2022-nilai-ekspor-nikel-indonesia-ke-tiongkok-tembus-rp60-triliun (Accessed: 28 Mei 2023).

Limanseto, H. (2023) *Tingkatkan Daya Saing Nasional dan Ciptakan Multiplier Effect, Pengembangan Industri Hilirisasi Nikel Terus Didorong Pemerintah* (online). Available at: https://www.ekon.go.id/publikasi/detail/4915/tingkatkan-daya-saing-nasional-dan-ciptakan-multiplier-effect-pengembangan-industri-hilirisasi-nikel-terus-didorong-pemerintah (Accessed: 25 Mei 2023).

M. Brunner, I.M.I. (2021) "Pemilihan Baterai Kendaraan Listrik dengan Metoda Weighted Objective", *Jurnal Serambi Engineering*, 6(1), pp. 1563–1572. doi: https://doi.org/10.32672/jse.v6i1.2644.

Ministry of Energy and Mineral Resources of the Republic of Indonesia (2020) *Indonesian Minerals, Coal, and Geothermal* (online). Available at: https://geologi.esdm.go.id/storage/publikasi/BZndhEYcRYSGJHh3XKSnEVsrE3HwbzDohxcs3veV.pdf (Accessed: 25 Mei 2023).

Monavia (2023) *Nilai Ekspor Nikel Indonesia Cetak Rekor pada 2022* (online). Available at: https://dataindonesia.id/sektor-riil/detail/nilai-ekspor-nikel-indonesia-cetak-rekor-pada-2022 (Accessed: 20 Maret 2023).

Muliawati, F.D. (2023) *RI Kalah Gugatan Nikel di WTO, Gimana Nasibnya Kini?* (online). Available at: https://www.cnbcindonesia.com/news/20230210165529-4-412880/ri-kalah-gugatan-nikel-di-wto-gimana-nasibnya-kini (Accessed: 30 Maret 2023).

Munatama, A. dan Zhaidah, K. (2023) "Analisis Kerjasama Bilateral Sosial politik China dan Indonesia Dalam Masa Kepemimpinan Joko Widodo 2014-2020", *Jurnal Artefak*, 10(1). doi: https://doi.org/10.25157/ja.v10i1.9283.

Mustafa, M. et al. (2022) "Evaluasi Kesuburan Tanah Pada Lahan Pasca Tambang Nikel Laterit Sulawesi Tenggara", Ilmu Alam dan Lingkungan, 13(1), pp. 52–56. doi: https://doi.org/https://doi.org/10.20956/jal.v13i1.20457.

Mutia, A. (2022) 'Katadoks' Negara dengan Emisi Kabon Kumulatif Terbesar 2021 (GtCO2). Available at: https://databoks.katadata.co.id/datapublish/2022/11/10/10-negara-penyumbang-emisi-karbon-terbesar-di-dunia-ada-indonesia (Accessed: 24 April 2023).

Nur, A.I. dan Kurniawan, A.D. (2021) "Proyeksi Masa Depan Kendaraan Listrik di Indonesia: Analisis Perspektif Regulasi dan Pengendalian Dampak Perubahan Iklim yang Berkelanjutan", *Jurnal Hukum Lingkungan Indonesia*, 7(2), pp. 197–220. doi: https://doi.org/10.38011/jhli.v7i2.260.

Okano-Heijmans, M. (2011) "Conceptualizing economic diplomacy:the crossroads of international relations, economics, IPE and diplomatic studies", *The Hague Journal of Diplomacy*, 6(1–2), pp. 7–36. doi: https://doi.org/10.1163/187119111X566742.

Perwita, A.A.B. dan Yani, Y.M. (2011) *Pengantar Ilmu Hubungan Internasional*. Bandung: Remaja Rosdakarya.

Prameswari, N.M. (2018) "Dinamika Perdagangan Bilateral Indonesia-Jepang Selama Implementasi IJEPA", *eJournal Ilmu Hubungan Internasional*, 6(2), pp. 853–868. Available at: https://ejournal.hi.fisip-unmul.ac.id/site/wp-content/uploads/2018/07/34.%201102045148%20-%20Nanda%20Mustika%20Prameswari%20(07-15-18-01-02-05).pdf.

Putri, S.Y. dan Ma'arif, D. (2019) "Dinamika Hubungan Kerja Sama Indonesia- Cina di Era Pemerintahan Joko Widodo", *Jurnal Lemhanas RI*, 37, pp. 15–24. doi: https://doi.org/10.55960/jlri.v7i1.47.

Rana, K.S. (2007) *The Encyclopedia of Diplomacy* (online). Available at: https://doi.org/10.1002/9781118885154.dipl0023.

Santika, E.F. (2023) *Pemerintah Berambisi Bangun 53 Smelter pada 2024, Ini Rinciannya* (online). Available at: https://databoks.katadata.co.id/datapublish/2023/04/27/pemerintah-berambisi-bangun-53-smelter-pada-2024-ini-rinciannya (Accessed: 8 November 2023).

Santoso, B. (2017) "Kebangkitan Ekonomi China Dan Pengaruhnya Terhadap Beberapa Negara Di Kawasan Asia", *Global Insight Journal*, 2(1), pp. 227–249, doi: https://doi.org/10.52447/gij.v2i1.1657.

Sarianto, D., Simbolon, D. dan Wiryawan, B. (2016) "Dampak Pertambangan Nikel Terhadap Daerah Penangkapan Ikan di Perairan Kabupaten Halmahera Timur (Impact of Nickel Mining on Fishing Ground in East Halmahera District Waters)," *Jurnal Ilmu Pertanian Indonesia* (JIPI), 21(2), pp. 104–113. doi: https://doi.org/10.18343/jipi.21.2.104.

Setiawan, A., Affianty, D. dan Tanjung, N.F. (2022) "Upaya Diplomasi Vaksin Indonesia Melalui Jalur Multilateral dan Bilateral", *Independen: Jurnal Politik Indonesia dan Global*, 3(1), p. 2. Doi: https://doi.org/10.24853/independen.x.x.xx-xx.

Sidabutar, V.T.P. (2020) "Kajian Pengembangan Kendaraan Listrik di Indonesia: prospek dan hambatannya", *Jurnal Paradigma Ekonomika*, 15(1). doi: https://doi.org/https://doi.org/10.22437/paradigma.v15i1.9217.

Sitompul, samuel C. dan Haka, P.A.R. (2020) "Kutukan Sumber Daya Alam Timah: Ironi Ketimpangan Dalam Kelimpahan Tambang Bangka Belitung", *PROSIDING TPT XXIX PERHAPI*, 29 (December), pp. 221–232.

Soviyaningsih, K.N. (2019) "Kepentingan Indonesia Terhadap One Belt One Road (OBOR) Dalam Upaya Mewujudkan Poros Maritim Dunia", *Jurnal Transborders*, 2(2).

Sukma Aisya, N. (2019) "Dilema Posisi Indonesia dalam Persetujuan Paris tentang Perubahan Iklim", *Indonesian Perspective*, 4(2), pp. 118–132. doi: https://doi.org/https://doi.org/10.14710/ip.v4i2.26698.

Susanto, D. (2022) "Belt Road Initiative (BRI) Dan Kerangka Kebijakan Hukum Ekonomi Indonesia", *JUEB: Jurnal Ekonomi dan Bisnis*, 1(3), pp. 82–89. doi: https://doi.org/10.55784/jueb.v1i3.272.

Syarifuddin, N. (2022) "Pengaruh Industri Pertambangan Nikel Terhadap Kondisi Lingkungan Maritim di Kabupaten Morowali," *Jurnal Riset & Teknologi Terapan Kemaritiman*, 1(2). doi: https://doi.org/10.25042/jrt2k.122022.03.

Tri Andika, M. dan Nur Aisyah, A. (2017) "Analisis Politik Luar Negeri Indonesia-China di Era Presiden Joko Widodo: Benturan Kepentingan Ekonomi dan Kedaulatan?," *Indonesian Perspective*, 2(2), p. 161. doi: https://doi.org/10.14710/ip.v2i2.18477.

Tritto, A. (2023) *How Indonesia Used Chinese Industrial Investments to Turn Nickel into the New Gold* (online). Available at:

https://carnegieendowment.org/2023/04/11/how-indonesia-used-chinese-industrial-investments-to-turn-nickel-into-new-gold-pub-89500 (Accessed: 7 November 2023).

Utami, R. (2015) *Hubungan Indonesia-Tiongkok: dari Soekarno hingga Jokowi* (online). Available at: https://www.antaranews.com/berita/490460/hubungan-indonesia-tiongkok-dari-soekarno-hingga-jokowi (Accessed: 30 November 2023).

U.S. Geological Survey. (2021). Mineral Commodity Summaries.

U.S. Geological Survey. (2022). Mineral Commodity Summaries. U.S. Government Publishing Office.

Wicaksono, R.A. (2023) *Kawasan Hutan Seluas 765 Ribu Hektare jadi Konsesi Tambang Nikel* (online). Available at: https://betahita.id/news/detail/8792/kawasan-hutan-seluas-765-ribu-hektare-jadi-konsesi-tambang-nikel.html?v=1684714832 (Accessed: 26 Mei 2023).

Widyastuti, Rr. A.Y. (2021) *Produsen Nikel Asal Cina Ini Bakal Bangun PLTS di RI Paling Lambat Tahun 2026* (online). Available at: https://bisnis.tempo.co/read/1441276/produsen-nikel-asal-cina-ini-bakal-bangun-plts-di-ri-paling-lambat-tahun-2026 (Accessed: 9 November 2023).

Winona, C.V. (2022) *Industri Nikel Indonesia Pasca Sengketa Perdagangan dengan Uni Eropa* (online). Available at: https://cwts.ugm.ac.id/2022/11/03/industri-nikel-indonesia-pasca-sengketa-perdagangan-dengan-uni-eropa/ (Accessed: 20 Maret 2023).

Yasin, M., Wahab, A. dan Sakaria, M. (2021) "Ada Apa Dengan Idustri Pertambangan Indonesia? Sebuah Tinjauan Singkat dari Sudut Pandang Makro Ekonomi", *Journal Ekonomi Trend*, 09(02), pp. 57–67. doi: https://doi.org/10.31970/trend.v9i2.218.

Yu H, Li S, Yu L, Wang X. The Recent Progress China Has Made in Green Mine Construction, Part II: Typical Examples of Green Mines. Int J Environ Res Public Health. 2022 Jul 3;19(13):8166. doi: 10.3390/ijerph19138166.

Zakiyya, A. dan Purnama, C. (2022) "Pembangunan Infrastruktur di Indonesia dalam Kerja Sama Indonesia-Tiongkok tahun 2010-2018", *Padjadjaran Journal of International Relations*, 4(2), p. 92. doi: https://doi.org/10.24198/padjir.v4i2.39364.