

How has the inclusion and upgrading of some actors in the nickel supply chain coincided with the exclusion and marginalisation of other actors?

1. Introduction

On the coast of Morowali Regency, in the Indonesian province of Central Sulawesi, formerly clear coastal waters have turned a reddish-brown colour, thriving fisheries have declined, and many islanders' health has deteriorated (EJ Atlas, 2022). Scholars have praised Indonesia's growing nickel industry as successful economic upgrading by shifting to higher value activities in the nickel supply chain but have overlooked the socio-economic impacts in areas like Morowali (Schröder and Iwasaki, 2023, p.9; Suherman and Saleh, 2018, p.59). With global nickel demand set to rise by an additional 19 times by 2040, mainly due to nickel's use in renewable energy technologies (RETs), the uneven impacts of its production must be considered (IEA, 2021). Therefore, to analyse the uneven development outcomes caused by the expanding Indonesian nickel supply chain, this essay addresses the question: How has the inclusion and upgrading of some actors in the Indonesian nickel supply chain coincided with the exclusion and marginalisation of other actors?

Leaning on a Marxist theoretical perspective, this essay argues that the expansion of the Indonesian nickel industry has produced disarticulations, defined as uneven and exclusionary development outcomes produced by supply chain shifts (Murphy, 2019, p.944). To analyse the actors affected by these shifts, this essay will apply Werner and Bair's (2011a, 2019) disarticulations perspective to the Central Sulawesi region through three key modes of disarticulation: (1) devaluation, (2) disinvestment and (3) constitutive exclusions. These modes reveal how large Chinese and Indonesian firms have been upgraded into higher value-added segments of the nickel supply chain, whilst artisanal and small-scale mining (ASM) groups and local communities have been systematically excluded and marginalised. This essay aims to show how the economic downgrading of these actors has been necessary for the economic upgrading of the former actors into higher value-added activities in the nickel supply chain.

This essay is structured as follows. The next section will outline the disarticulations perspective. Section 3 provides a brief outline of the nickel supply chain to provide context for section 4 where the disarticulations perspective will be applied to the case of Indonesia's nickel industry, specifically focusing on the nickel supply chain in Central Sulawesi to analyse the disarticulations generated. This will show how large Chinese and Indonesian firms have been upgraded into higher value-added segments of the supply chain, whilst artisanal and small-scale mining (ASM) groups and local communities have been excluded and marginalised. Finally, the essay concludes with reflections on the findings and suggests further areas of investigation for future research.

2. Disarticulations Perspective

Bair and Werner (2011a) developed the disarticulations perspective to revive the analysis of the uneven development generated by commodity chains. The disarticulations perspective seeks to resolve the 'inclusionary bias' of the global value chain (GVC) and global production network (GPN) approaches which heavily focus on the positive effects of integration into supply chains, obscuring the negative effects and systematic exclusion of actors from the benefits generated by supply chain growth. Werner and Bair (2019) have identified three interconnected modes of disarticulation – (1) devaluation, (2) disinvestment and (3) constitutive exclusions – which will be outlined below to create a more dynamic understanding of unevenness in Indonesia's nickel industry, highlighting how actors are reproducing North–South exploitation along South-South lines.

The first mode of disarticulation analyses how devaluation enables spatial and temporal restructuring. It operates by disincorporating assets, such as labour, land, and infrastructure, out of primary circuits of accumulation in supply chains to reincorporate them into circuits of accumulation at lower cost (Ibid., p.186). Devaluation is largely based on Harvey's (2020, p.121) theory of accumulation by dispossession (ABD) whereby resources are dispossessed of their original uses and values and repurposed to enable the expansion of capital. Harvey (Ibid.) argues that contemporary capitalism heavily depends upon ABD as there is an increasing centralisation of capital whereby large firms appropriate and consolidate assets from small producers to create a quasi-monopolistic situation. The state also plays a key role in the ABD process, by privatising state-owned enterprises (SOEs) and removing labour and environmental laws (Harvey, 2003, p. 148).

Disinvestment, equivalent to what GPN scholars refer to as decoupling, acts as the second mode of disarticulation, which examines how upgrading and incorporation in one context are often inextricably bound to capital flight and peripheralisation in another (Bair and Werner, 2011a). The process of disinvestment can be observed at both the macro and sub-national scales. It entails the expulsion or delinking of regions from supply chains because of shifts in international investment and sourcing (Werner, 2016). These shifts can be initiated by several socio-natural, political, and economic factors and often result in changes in the exploitable workforce if the composition of the workforce changes. The influence of Hall's (1980, p.306) articulation theory is particularly apparent in the disinvestment process, with the significance of race and racism to capitalist accumulation being materially determined and ideologically constructed in historically specific contexts.

Finally, the third mode of disarticulation, constitutive exclusions, refers to the processes by which regions and actors become detached from supply chains that may be integrating new regions and actors elsewhere (Bair and Werner, 2011a). Bair and Werner (2019, p.194)

discern three kinds of constitutive exclusions: (1) the growing differentiation between areas and people that are included and excluded in supply chains, (2) grounded studies of struggles over dispossession and (3) labour. The case study analysis will focus on the first kind of exclusion to provide an enhanced understanding of the dynamics of uneven development, by revealing how local communities have been excluded from the nickel supply chain growth. The three key modes of disarticulation outlined above will be used to analyse how the growth of the Indonesian nickel supply chain has facilitated the inclusion and upgrading of some actors but excluded and marginalised others. To provide the necessary background for this analysis, the next section will outline the global nickel supply chain.

2. Outline of the Nickel Supply Chain

Nickel is primarily used for stainless steel production but is also a crucial material for clean technologies as it is used in energy storage, particularly for EV batteries (Hund et al., 2020, p. 61). Global demand for nickel is forecast to grow by at least 65% by 2030, with EVs and battery storage set to surpass stainless steel as the largest application of nickel by 2040 (IEA, 2021). The growing demand is causing nickel mining to shift away from higher-grade sulphide ores, located in Australia, Canada and Russia, towards more abundant lower-grade nickel laterite ores, located in Indonesia and the Philippines (see Figure 1). Indonesia has rapidly risen from producing just 2% of the global supply of nickel in 2015 to become the largest producer in 2023, supplying half of the world’s supply (Fisher and Grossl, 2023). Over the next decade, Indonesia is expected to account for most of the growth in nickel extraction and processing, which will likely continue to flow to China, which is the largest importer of nickel ore, accounting for 56% of global imports in 2021 (Sanderson, 2020; OEC, 2023).

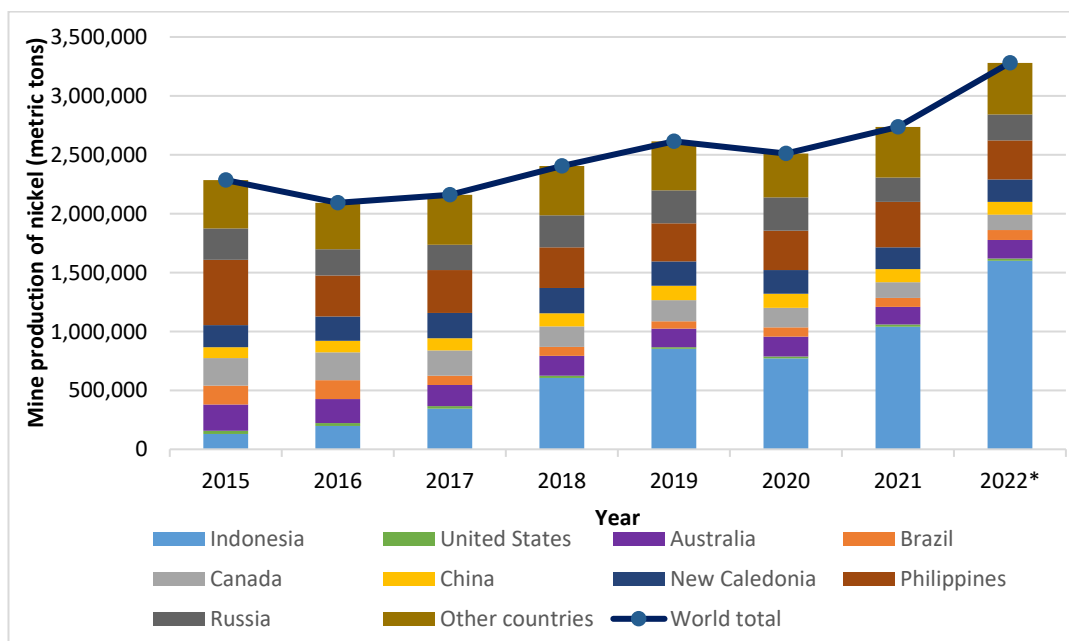


Figure 1. Global Nickel Production 2015-2022. Source: Author, with data compiled from United States Geological Survey, 2023 (*2022 is estimated production figures).

As Figure 2 shows, the nickel supply chain can be divided into four main stages: (1) mining, (2) processing and refining, (3) industry, and (4) application (Suherman and Saleh, 2018). The upstream mining stage involves the extraction of either nickel sulphide or laterite ores. Following this, the ores are then processed and refined into a variety of nickel products depending on the processing technology used (Munikhah and Ardi, 2021). These products are then further refined into finished goods for downstream industries to then be distributed to end users in their many respective forms.

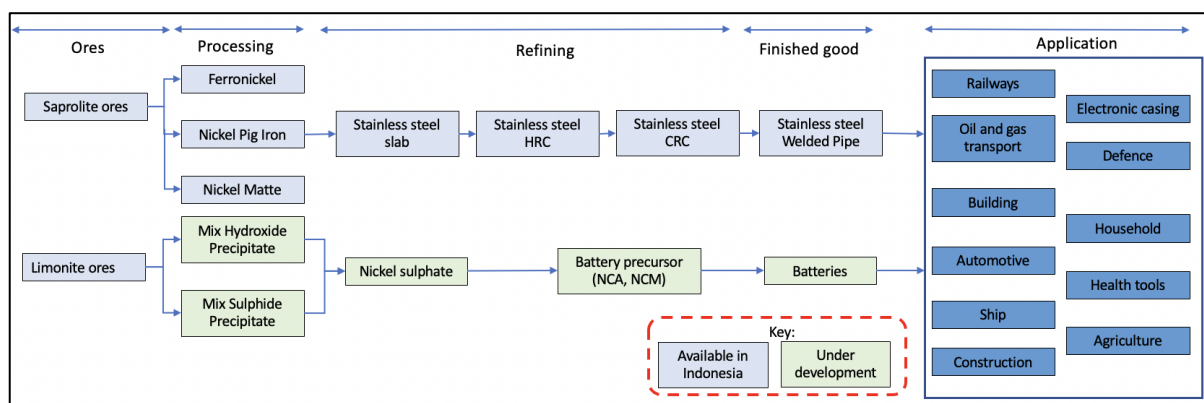


Figure 2. Indonesian nickel supply chain structure. Source: Author’s elaboration based on Munikhah and Ardi, 2021.

Indonesia has already established links to downstream industries in stainless steel (marked in light blue), whilst links to the battery industry are still under development (marked in green). To initiate the shift into downstream sectors, the Indonesian government enacted export bans on nickel ore from 2014 to 2017 and 2020, with a domestic processing requirement to attract downstream investments and increase value-added production (Tritto, 2023, p.12). These policies mandated that all foreign firms engaged in downstream nickel-based production must process and refine nickel within Indonesia before exporting the higher value-added products (Camba et al., 2022, p.2381). Consequently, Indonesia’s nickel-related exports rose from US\$4.5 billion in 2013 to an estimated US\$30 billion in 2022, driven by the exports of higher value-added products such as battery materials and stainless steel (UNCTAD, 2017; Medina, 2023). These developments have led Schröder and Iwasaki (2023, p.15) to praise Indonesia’s nickel export restrictions as successful economic upgrading. However, they exhibit the GVC approach’s ‘inclusionary bias’ by highlighting the benefits of Indonesia’s integration into the nickel-based EV battery GVCs, without illuminating the uneven impacts generated. Therefore, to address these issues, the next section applies Werner and Bair’s (2019) disarticulations perspective to the growth of the nickel industry in Central Sulawesi to reveal the disarticulations generated by Indonesia’s nickel industry growth.

3. Disarticulations in Indonesia's Nickel Industry

This section analyses how the growth of the nickel industry has generated disarticulations in Central Sulawesi. This region is reflective of the national context as it has developed from a major supplier of nickel ores to a prime hub for nickel processing and stainless-steel production following the onset of the Indonesian protectionist policies. These policies stimulated the inflow of Chinese capital into nickel processing and refining which culminated in the development of the Indonesia Morowali Industrial Park (IMIP) in the region. The park contains nickel processing and refining facilities with mines also located nearby. It is jointly owned by the Chinese steel giant Tsingshan, the world's largest nickel producer, and PT Bintang Delapan Group, one of the largest Indonesian mining companies (Ginting and Moore, 2021). The following three subsections apply the disarticulations perspective to Central Sulawesi to show how large Chinese and Indonesian firms have benefited through their inclusion in the nickel industry, at the expense of local communities and ASM groups who have been excluded and marginalised.

3.1. Devaluation

Following an import substitution industrialisation (ISI) development strategy, the Indonesian state has expanded the nickel industry by encouraging Chinese investment and devaluing the labour and resources of pre-existing groups. The Indonesian state has played a crucial role in attracting Chinese investments in the IMIP, through the introduction of export bans and laws, such as the 2020 Omnibus Law and 2020 Mining Law Amendment that lowered labour and environmental regulations to encourage further foreign investment and value-chain upgrading (Tritto, 2023). However, these measures have created conditions which have benefited Chinese-Indonesian smelting consortiums by marginalising ASM groups. The export bans forced LSM firms and ASM groups to sell nickel to smelting consortiums, consisting of a small number of Indonesian and Chinese smelting companies. The Chinese-Indonesian smelting consortiums acted as an industrial oligopsony, as they set the price of nickel at very low rates, reducing the profits of LSM firms and ASM groups through devaluing their resources (Camba, 2021, p.2). In doing so, they created an environment which economically values high-grade nickel and devalues the low-grade variant. In response, LSM firms adopted a cost-shifting approach by exploiting ASM groups to increase their profits. LSM firms demanded more intensified work from ASM miners working in their licence area through casual labour, lower hourly rates and lowering the nickel purchasing prices by 30% to compensate for the price set by the consortiums (Ibid., p.7). LSM firms also expanded their operations by displacing existing ASM groups, essentially passing the economic costs onto ASM groups (Camba, 2021). This exemplifies Harvey's (2020, p.121) ABD whereby LSM firms appropriate assets from small producers, facilitated by state support in the form of new laws and regulations. Chinese-Indonesian smelting consortiums have pressured LSM firms, who in turn have exploited ASM groups to protect their profits. More broadly, the IMIP highlights the

neo-colonial relations between China and Indonesia, whereby the Indonesian state has encouraged Chinese investment in the mining industry at the expense of ASM groups, similar to the Dutch colonial state which also encouraged private firms to invest in the mining industry using coercive forms of labour (Sangadji, 2022).

3.2. Disinvestment

The growth of the nickel industry in Central Sulawesi has been underpinned by regional disinvestment due to the shift in international investment since the export ban was imposed in 2014. The export ban generated large uncertainties for foreign investors and led to companies from the Global North withdrawing their investments in the Indonesian mineral sector, whilst Chinese firms heavily invested (Tritto, 2023, p.6). This led to large disparities in FDI realisation between Central Sulawesi and the rest of Sulawesi (North, South, Southeast and West Sulawesi) as Figure 3 illustrates below. Both regions witnessed similar levels of modest growth in FDI from 2006 to 2012, but after the IMIP started construction in 2012, FDI in Central Sulawesi grew significantly faster than the rest of Sulawesi, growing by an average annual growth rate of 44% compared to 16% which reveals the shifting regional focus of international investors. The dramatic divergence in FDI between the two regions in 2022, where investment fell by nearly a third in the rest of Sulawesi whilst investment significantly grew by 175% in Central Sulawesi was most likely linked to the heightened global nickel prices in 2022, but it may also reveal the beginning of future patterns of uneven development in the region given the heightened nickel demand for RETs.

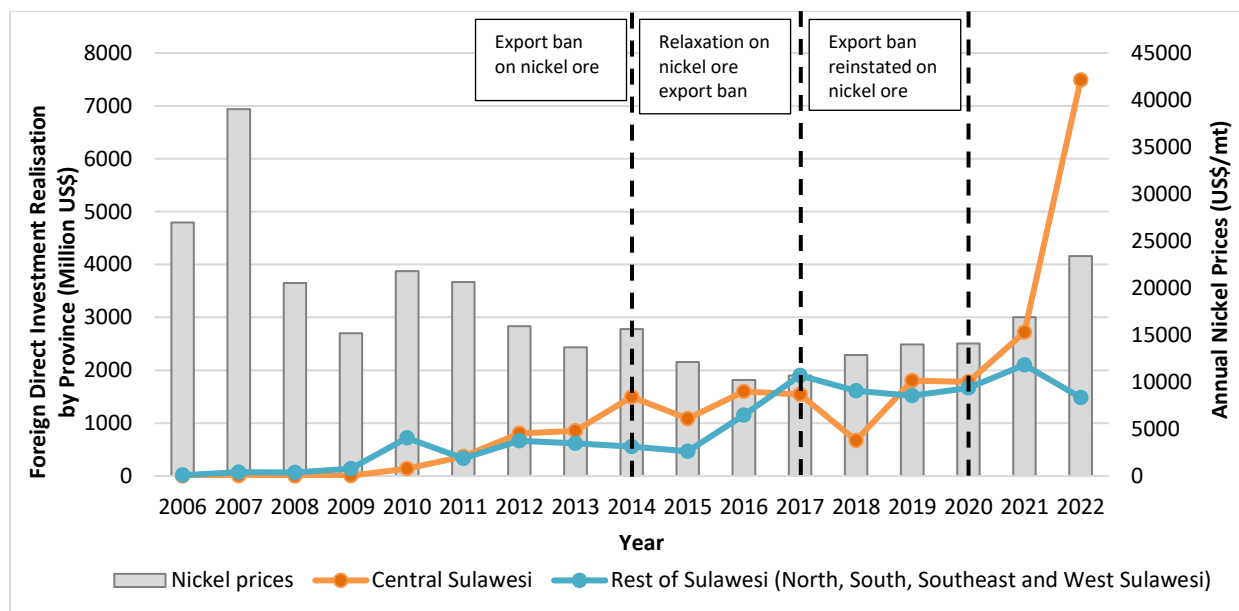


Figure 3: Foreign Direct Investment Realisation in Sulawesi compared to Global Annual Nickel Prices 2006-2022. Source: Author, with data compiled from Badan Pusat Statistik, 2023a and World Bank Commodity Price Data, 2024.

The shift in investment to Central Sulawesi has also caused new forms of labour exploitation due to changes in the composition of the workforce. As many locals do not possess the skills to work at the IMIP or prefer to work in the informal sector, this has led to a large influx of Chinese migrant workers (Ginting and Moore, 2021). These Chinese employees often take on supervisory or managerial roles with higher pay compared to their Indonesian counterparts (Tritto, 2023). Indonesian workers in the IMIP have also been subject to labour malpractices such as contract terminations, extended working hours, unfair wages, and being vulnerable to safety hazards and workplace disasters by Tsingshan and Bintang Delapan who own the park (EJ Atlas, 2022). This also exemplifies Hall's (1980) articulation theory, as racial differences have enabled these firms to create exploitative conditions based on a division of labour whereby Chinese migrant labourers exert control over Indonesian employees. This has contributed to cultural conflicts between the two groups in the region, intensifying anti-Chinese sentiment which has lingered since the colonial era, stemming from the preferential treatment of Chinese workers over Indonesians by the Dutch colonisers (Tritto, 2023).

3.3. Constitutive Exclusions

Whilst the IMIP has provided some benefits to the Central Sulawesi region through increased output (GDP) and local tax revenue, as well as providing employment opportunities to some of the local population, it has also excluded many of the local population (Suryadinata and Negara, 2023, p.5). Aside from nickel, the region was previously also rich in marine resources and many locals are still engaged in traditional farming and fishing activities (Sangadji et al., 2019, p.19). However, the decline in government investment in agricultural projects, coupled with the environmental impacts of the IMIP, has disadvantaged these groups (Ginting and Moore, 2021). Figure 4 shows how the contribution of agriculture, forestry and fishing to Central Sulawesi's GDP has significantly declined since 2010, whilst the contribution of the mining and manufacturing sectors has increased. This decline has also coincided with annual profit increases for Tsingshan, rising by an average of 64% from 2019-2022. This highlights how the growth of the nickel industry has benefited large Chinese firms, at the expense of other industries outside of the nickel supply chain. Building an industrial park increased Tsingshan's profits by relocating processing from China to Sulawesi, utilising cheap Indonesian resources and labour, with less stringent environmental regulations and oversight (Tritto, 2023). However, local villages near the park have been severely impacted by the transformation from a coastal and small island tourism zone into an industrial area (Rushdi et al., 2021, p. 67). The IMIP has undermined small-scale agricultural and fishing productivity through the considerable deforestation caused by the mining operations which have polluted rivers with waste products, degrading the seawater quality in local areas (Sangadji, 2022). Consequently, many farmers and fishermen have protested in Sulawesi due to the impacts of nickel mining on the environment affecting their traditional livelihoods (Morse, 2019). Hence, this clearly illustrates how large Chinese firms have profited from the exclusion of local communities from the nickel industry.

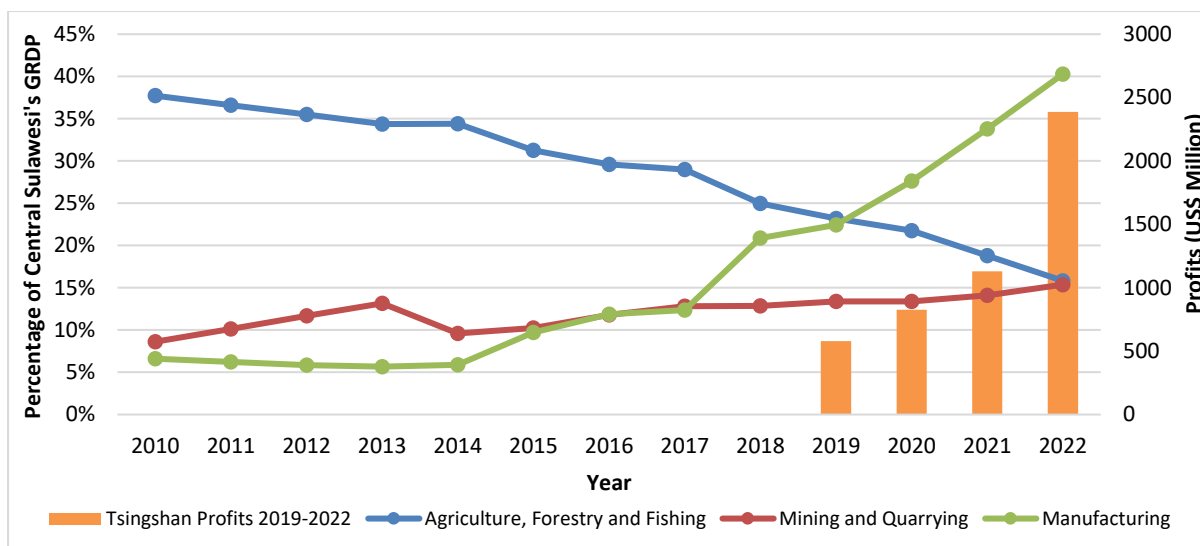


Figure 4: Sectoral Contribution to Provincial GRDP in Central Sulawesi 2010-2022 compared to Tsingshan Profits 2019-2022 (no data available before 2019). Source: Author, with data compiled from Badan Pusat Statistik, 2023b and Fortune, 2023.

4. Conclusion

In conclusion, this essay has applied the disarticulations perspective to show how the expansion of the Indonesian nickel industry has produced disarticulations in Central Sulawesi whereby large Chinese and Indonesian firms have benefited through their inclusion and upgrading in the Indonesian nickel supply chain, whilst ASM groups and the local communities have been systematically excluded and marginalised. Facilitated by the measures imposed by the Indonesian state, ASM groups have been detrimentally affected by lower nickel rates, more intensified work and displacement by the pressures imposed on them by LSM firms. Similarly, local farmers and fishermen in Central Sulawesi have been excluded from the benefits of the nickel industry growth and their livelihoods have suffered from the waste generated by the IMIP. The marginalisation and exclusion of these actors enabled the upgrading of large Indonesian and Chinese firms in the nickel industry, such as Bintang Delapan and Tsingshan, who utilised cheap Indonesian resources and labour, with less stringent environmental regulations and oversight, to shift into downstream nickel production and extract larger profits.

This essay's findings have important policy implications which should be considered by Indonesian policymakers as the nickel industry continues to grow. However, it is important to highlight that this study has been limited by its critical focus based on anglophone academic resources and would benefit from follow-up primary research in Indonesia to corroborate this essay's findings. Furthermore, despite the valuable insights provided by the disarticulations perspective in revealing uneven development generated by the Indonesian nickel industry, it is somewhat biased and potentially misleading in emphasising the downsides of the growth of the nickel industry whilst overlooking the opportunities created. Future research may

overcome this bias by adopting multiple frameworks to provide a more nuanced account of the development implications generated by the Indonesian nickel industry.

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