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ADVANCING RENEWABLE ENERGY POLICY IN A FRACTURED GLOBAL ECONOMY: A NEW STRUCTURAL ECONOMICS APPROACH FOR DEVELOPING NATIONS

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Abstract.

With the rapid evolution of global energy transition, emerging economies are under increasing pressure to upgrade the industrial structures and assert strategic position in global value chains. Indonesia with rich natural resources approaches a crucial moment to prevent the mid-income trap and technological stagnation. This paper analyses the New Structural Economics (NSE) as a model for industrial transformation through the experiences of Indonesia in the development of downstream resource-based industries for technological transfer and regional cooperation in energy trade. Using qualitative content analysis of policy documents, expert statements, regional cooperation frameworks, and institutional arrangements, the paper analyses regulatory coherence, public participation, and inter-institutional coordination in the country. Empirical evidence, coupled with the nickel export ban and the involvement in the Asean Power Grid serve to show the potential and limitations of NSE principles into practice. Results underscore the significance of a standard body and regulation, public trust, the inclusiveness of human capital development, and sustainability assurance. Drawing from the analysis, the research suggests that an integrated, pro-active and participatory policy approach based on NSE may help Indonesia take a leading role in the regional energy transition and competitive industrial future.

Keywords: downstreaming; energy transition; structural economics; sustainable development; middle-income trap

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Introduction

The international energy scene is changing rapidly, and developing countries are under increasing pressure to find their place in this transition (1,2). Indonesia, rich in natural resources, sits on a knife edge. Industrial policy can accomplish value-added growth, technology upgrading and strategic place taking in the world market (3,4). Yet, lopsided world architectures and risks of path dependency challenge the sustainable progress. Without a thoughtful approach, the country risks being stuck in the middle-income trap and locked into the low-technology path. This paper examines how New Structural Economics (NSE) can provide a route for Indonesia to effectively make use of resource endowments, to move up the value chain, and to resist development dragging. The emphasis is placed on an integrated, resource-based industrial policy, which secures technological spillovers, regional equity, environmental sustainability, and national development (5,6).

Literature Review

Theoretical Studies

New Structural Economics (NSE) underscores the state's role in promoting structural transformation through industrial policies geared towards a country's comparative advantage (7). The theory holds that developing countries ought to harness their comparative advantages for examples, labour-intensive, low skill activities, and progressively master more complex industries and technologies. Contrast with classical structuralism is that NSE prescribes market-oriented mechanisms tampered with a facilitated state. By identifying key variables among the NSE and then facilitating the extension of the NSE to resource-rich settings, that focus on industrial diversification and policy stability, infrastructure matching and coordinated governance. Strategic downstreaming is something that becomes imperative, for resource producers to get upstream and to create some value added. The transformation also needs public backing, regulatory predictability and human capacity building for an advanced technology uptake to be incorporated.

Empirical Studies

Indonesia presents a case example to explore when NSE principles were developed through early stages of implementation, namely the raw nickel export ban (8,9). This through-course encouraged investment in domestic smelting and refining industries. The trade talks initiated by policy themselves provoked reactions from international communities and prompted domestic discussions about the relationship between the national interest and international norms.

Meanwhile, the ASEAN Power Grid (APG) has become a regional pilot site for cross-border energy exchange and electricity market interconnections (10,11). Although the technical concept has been around for more than ten years, the developments in the Laos–Thailand–Malaysia–Singapore (LTMS) corridor show that multilateral cooperation is possible. The APG is a demonstration case for broader regional integration, especially a possible Indonesia in the Brunei–Indonesia–Malaysia–Philippines (BIMP) region. Indonesia's own active engagement with these processes exposes the problems of technological dependence, popular opposition, and disjointed governance (5,6). Discipline in regulations, non-transparent wheeling charges, and standardisation in power purchase agreements would help build investors' confidence and expedite investment in infrastructure.

Methods

The study applies a qualitative content analysis method, described as a research technique for making replicable and valid inferences from analysing textual (12,13). Analytically, the pays attention to Indonesia's strategic industrial transformation in the light of NSE, especially in the challenge of resource-based industrialization, technology dependence, and upgrading the global value chain. The analysis is informed by a diverse set of textual sources, comprising of national policy documents, ministerial policy papers, international trade agreements and processes, regional energy cooperation approaches, and various technical considerations related to infrastructure and governance. Selection of sources prioritises information that is highly relevant to the consistency of regulations, absorption of technology, engagement with the public and industrial upgrading. The focus of analysis is the institutional arrangements, policy interventions comprising of the regional mechanisms like the ASEAN Power Grid, reflecting the operationalisation of NSE principles. Trustworthiness and rigour of analyses are established through triangulation using government documents, international development reports, expert opinion and academic literature for contextual accuracy.

Results and Discussion

The application of NSE to industrial and energy policy in Indonesia offers both promise and limitations (5,6). Leveraging mineral rich areas as a basis for the development of downstream industries makes sense, but several obstacles, for example lack of technology transfer, public scepticism, and administrative incoherence require resolution. Other challenges like the absence of standardized Power Purchase Agreements (PPAs) procurement, competition rules across provinces, and lack of transparency in cross-border electric charges impede regional

trade and FDI. In retaliation, regulatory consistency and grid standardization have become important enablers for connecting Indonesia's infrastructure to regional systems like the APG (10).

Public perception is crucial (5,6,14,15). Disinformation and misinformation campaigns undermine national energy planning, particularly in regions experiencing changes in land use or economic systems. Involving local communities in a way that minimizes risks of displacement continues to be key to ensuring social buy-in. Furthermore, the local populations need to be convinced that the benefits will reach the community employment, welfare and access to energy when designing their policies. Another pillar is the development of human capital (5,6,16). An energy transition that works will require much more than labour. The gap is skills and knowledge to control and co-develop high tech. Investments in education and training, as well as in knowledge transfer will then need to come with an industrial policy if Indonesia is to become more than a "supplier of hands and legs" to foreign technologies.

Export sustainability also depends on being strategically located in global trade (17,18). For example, the EU Deforestation Regulation (EUDR), which establishes criteria of sustainability on the part of the exporting countries. Avoiding future export restrictions and showing that Indonesia is a responsible supplier can be done by proactively embedding resource governance in international environmental standards. The state also needs innovation ecosystems, R&D capital, and support for start-ups. Technology transfer and sustainable industrial development can be unlocked by creating a favourable business environment and policy coherence.

Conclusion

With plenty of potentials, Indonesia can take the lead in global energy transition and regional electricity trading. But this potential can be realized only with a judicious application of New Structural Economics. Industrial policy should be in line with resources endowments, underpinned by good governance, stability of regulation and popular support. To climb up the value ladder, Indonesia needs to develop technology transfer, human capital, and the protection of the environment. The ASEAN Power Grid and the nickel export ban point out to some early-stage success, however, there is also a requirement for enhanced coordination and institutional reform to spur investment and innovation. At this time of critical importance, Indonesia must decide whether to cooperate or lead. A deliberate, steady and inclusively informed strategy based on NSE principles will lead to sustained

competitiveness, fairness in development, and sustainable energy futures.

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