

# Publications Catalogue 2024



ERIA (Economic Research Institute for ASEAN and East Asia) publishes a diverse range of materials including books, research reports, discussion papers, and policy briefs to disseminate its research findings and policy recommendations. These publications cover various topics focusing on deepening economic integration, narrowing development gaps, and sustainable development, which are the three pillars underpinning ERIA's research agenda. Additionally, ERIA is actively engaged in energy-related research and has been conducting research on healthcare, the environment, and agriculture for the past 5 years.

During the fiscal year 2023, ERIA played an active role in supporting the ASEAN Chairmanship of Indonesia. It published numerous reports, policy briefs, and discussion papers exploring their implications for various aspects of the economy such as trade, investment, fiscal policy, energy, and healthcare. ERIA also collaborates with leading global publishers, co-publishing books with entities such as Routledge, Springer, World Scientific, and IGES. Notably, ERIA released 10 books during this period, including the two-series 'Infrastructure for Inclusive Economic Development' with a foreword from President Joko Widodo of Indonesia and contributions from three ministers. Furthermore, ERIA launched the book titled 'Viet Nam 2045: Development Issues and Challenges,' officially introduced by H.E. Thuong, President of Viet Nam, and Prime Minister Fumio Kishida of Japan.

In fiscal year 2023 alone, ERIA produced a total of 10 books, 31 research project reports, 35 discussion papers, and 15 policy briefs, highlighting its commitment to generating valuable insights and recommendations for the region.



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Book



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Policy Briefs



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Research Project  
Reports

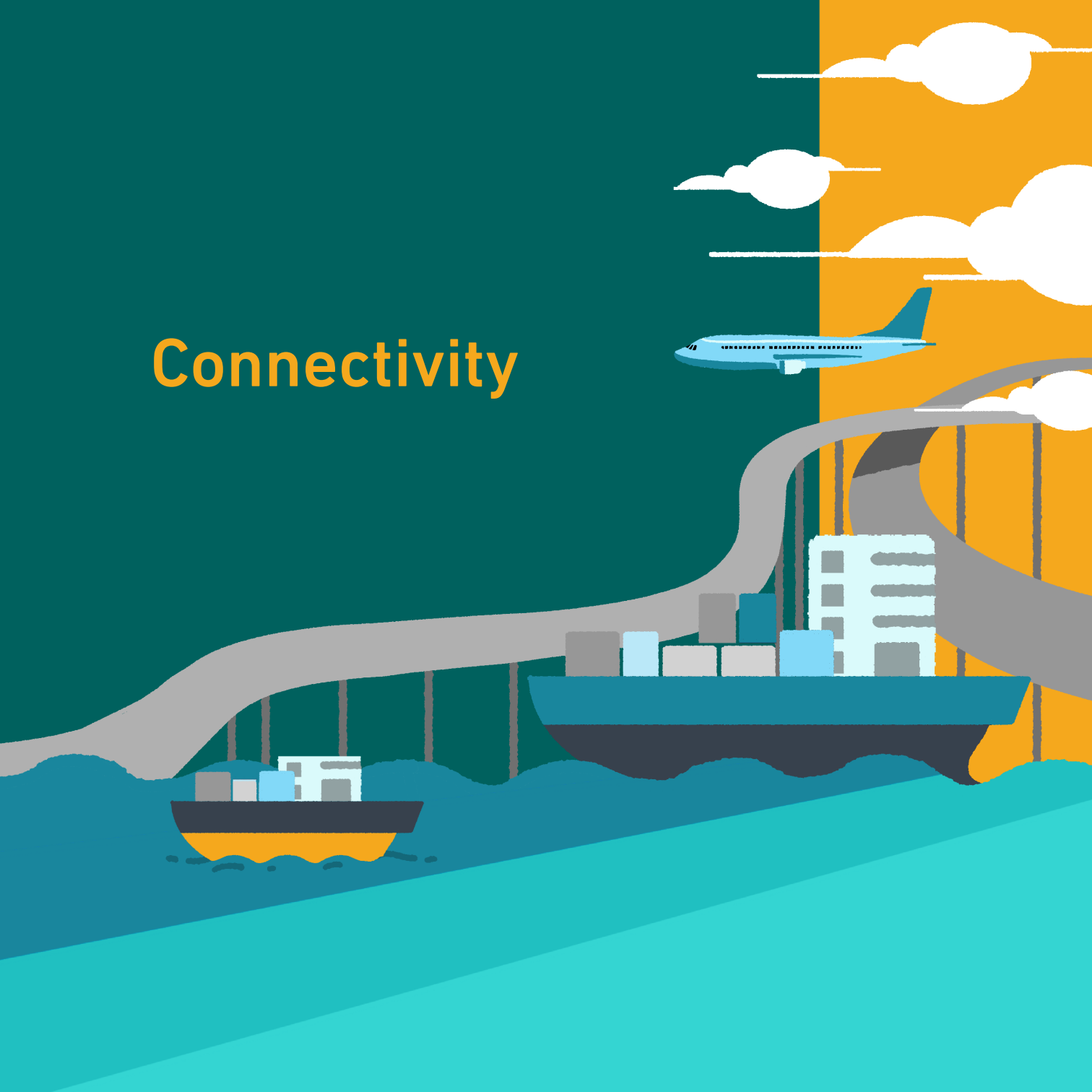


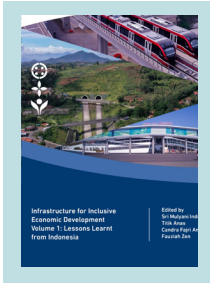
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Discussion  
Papers



# Connectivity



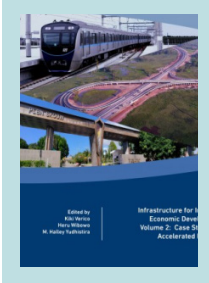


## Infrastructure for Inclusive Economic Development Vol. 1: Lessons Learnt from Indonesia

Edited by Sri Mulyani Indrawati, Titik Anas,  
Candra Fajri Ananda, Fauziah Zen



Indonesia, as the world's largest archipelagic nation state, has made great progress in infrastructure development over the past half-century. However, the nation still faces immense infrastructure challenges, ranging from traditional concerns like 'roads and bridges' to contemporary imperatives such as navigating the global digital revolution and addressing the urgent threat of climate change. In this noteworthy compilation of papers, a distinguished group of Indonesian academics and policymakers delves into these issues, presenting a thorough examination and advocating for a comprehensive policy agenda. The focus centres on the implementation of the President Joko Widodo administration's infrastructure policy framework, known as the National Strategic Project (PSN). This collection serves as an invaluable guide for policymakers and development practitioners, offering insights not only applicable to Indonesia but also relevant to other developing economies.



## Infrastructure for Inclusive Economic Development Vol.2: Case Studies of Accelerated Projects

Edited by Kiki Verico, Heru Wibowo, M. Halley Yudhistira

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This second volume of the book on infrastructure for inclusive economic development delineates twenty initiatives within the National Strategic Project (PSN), encompassing both social and economic infrastructure. Serving as a supplement to the theoretical discussions in Volume I, the actual case studies in this volume underscore the importance of the acceleration policy in overcoming obstacles and expediting implementation.

The featured projects address the demand for utilities, enhanced social welfare, connectivity, and industrial development, showcasing diverse categories that constitute essential components of infrastructure development. Additionally, the volume delves into the analysis of funding and finance, offering insights into various strategies, including innovative finance covered in Volume I. Derived directly from the field, these case studies provide readers with valuable insights into the practical aspects of infrastructure initiatives.



## **Attracting Global Talents: Bringing Digital Nomads and the Highly Skilled into ASEAN**

ERIA Policy Brief 2023 No. 11

by Amelia Litanía, Giulia Ajmone Marsan

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The advancement of technology and borderless working accelerated by the coronavirus disease (COVID-19) has pushed the Association of Southeast Asian Nations (ASEAN) to rethink its strategy in the race for global talent. ASEAN needs to address domestic challenges and gaps in talent and skills development. The rise of 'digital nomads' and digital talent mobility can provide a significant boost to ASEAN's competitiveness on the global stage by contributing to innovation, business creation, and economic growth. This brief explores approaches taken by ASEAN countries to attract and retain global talent and digital nomads, highlighting characteristics of digital nomad and talent visas as well as strategic policies ASEAN must consider to create a vibrant ecosystem in this sphere.

## **Reconnecting ASEAN: The Impact of the COVID-19 Pandemic on Trade, Transport, E-Commerce and Mobility of People**

ERIA Research Project Report 2023 No. 6

Edited by Fauziah Zen, Fukunari Kimura

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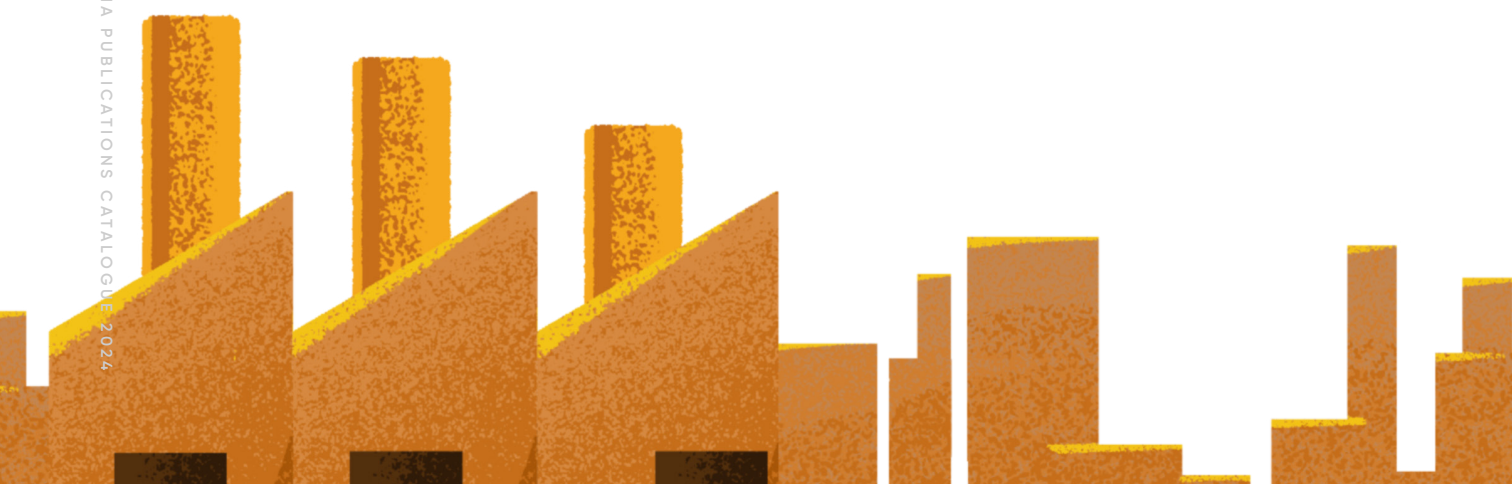
Prior to the pandemic, cross-border trade and people mobility were experiencing significant growth, painting a promising picture for East Asia's thriving economy and connectivity. The cumulative growth of international travelers arriving at ASEAN Member States from 2009 to 2019 reached an impressive 170%, highlighting a strong demand for air transportation. However, the onset of the pandemic caused a drastic decline, plummeting to -81% by 2020.



This severe downturn had devastating consequences for the travel industry in Southeast Asia. Government measures to limit people-to-people interactions further exacerbated the situation, leading to a sharp decline in regional growth from 5.2% in 2018 to -3.2% in 2020.

This report aims to document the economic hardships related to connectivity during the COVID-19 pandemic. Specifically, it focuses on three key activities: trade (cargo), transportation, and e-commerce in five East Asian economies, including Japan, which is a significant trading partner of ASEAN. Except for e-commerce, the initial two years of the pandemic proved to be particularly challenging for all economies involved in maintaining their connectivity.

The report provides a compilation of stories illustrating the impact of the pandemic on these economic sectors, shedding light on the difficulties faced by each. It offers insights into the unprecedented challenges and disruptions experienced during this period, highlighting the resilience and adaptability of the East Asian economies.



# Survey for Framework Building of 'People-Centric' Smart City Model in ASEAN Countries

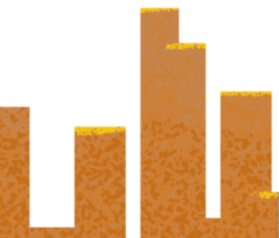
ERIA Research Project Report 2023 No. 24

Edited by Keita Oikawa, Fumitaka Machida, Yoichiro Hatakeyama, Kazuhiko Ono, Chisa Uhira, Kumiko Horiba

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The ultimate objective of urban policies is to enhance citizens' attachment to their city and overall well-being. While ASEAN policymakers traditionally emphasise convenient infrastructure for citizen happiness, this study emphasises psychological and social factors, such as multicultural connections, healthy living with hobbies, and family relationships, as significant contributors to well-being. The recommendation is for ASEAN to transition towards 'People-Centric' Smart Cities (PCSC), prioritising social factors and involving citizens in urban development.

The study identifies six citizen clusters, with 'Active citizens for self-development and interest' and 'Active citizens for community' exhibiting high participation awareness, forming a foundation for promoting PCSC in ASEAN. Challenges include reassessing the relationship between well-being and urban policies, fostering collaboration, integrating information effectively, and addressing funding issues. Three key recommendations involve researching PCSC cases in Singapore, executing Proof of Concept in Thailand, Indonesia, and the Philippines, and establishing a framework for subjective indicators.



# Does the Skill Premium Influence Educational Decisions? Evidence from Viet Nam

ERIA Discussion Paper 2023 No. 475

By Ian Coxhead, Nguyen Dinh Tuan Vuong

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Viet Nam's economy has grown and changed in dramatic ways since WTO accession in 2007. Much of the growth and change is due to expanded international trade and FDI. These in turn have greatly increased domestic labour demand. However, growth that exploits the country's abundant supply of low-skill labour may depress the relative demand for skills. In this paper we ask whether the skill premium – the relative price of skills, which also measures the gross economic benefit to schooling at high school and beyond – plays an influential role in schooling decisions amongst teenagers for whom wage-work is an alternative to continued education. We first use event study methods to clarify trends in wages and skill premia. We then decompose influences on upper secondary school enrolments from income growth, demographic change, and skill premia. We find that the college skill premium has a positive influence on enrolments, whereas the premium from upper secondary completion has no significant effect. Our conclusions explore implications for future productivity growth as well as economic and educational policies.

# What Japanese Tourism Amenities are Influenced in Terms of Affecting Inbound Tourist Demand?

ERIA Discussion Paper 2023 No. 481

By Yoko Konishi, Takashi Saito

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Since 2012, the number of inbound tourists to Japan has increased every year, and new records of tourism-related economic indicators are being updated. On the other hand, the sudden inbound boom has led to a concentration of travel destinations, and over-tourism has become a problem. In this paper, we first statistically observe the concentration of tourists by accommodation type for each country of origin. Second, by identifying tourism amenities that contribute to inbound demand, we gain the knowledge necessary to shift demand from facilities with a high concentration of inbound tourists to facilities with lower occupancy. For the analysis, we utilised establishment data from the Online Travel Agency 'Accommodation Travel Statistics Survey' and data on tourism resources by region. The results show that the number of rooms, average price, membership of the hotel in a chain, internet availability, room type, number of World Heritage sites, and number of direct flights positively affect inbound demand. In particular, for ryokan (Japanese-style inns) with low occupancy rates and inbound guest ratios, their independence, internet availability, Western-style room availability, number of World Heritage sites, and hot spring facilities are effective in capturing demand.

# The Effects of the United States-China Trade War During the COVID-19 Pandemic on Global Supply Chains: Evidence from Viet Nam

ERIA Discussion Paper 2023 No. 483

By Duc Anh Dang, Ngoc Anh Tran

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The trade war between the United States (US) and China has affected their bilateral trade as well as that with other countries. This study investigates how Vietnamese firms performed during the COVID-19 pandemic under the shadow of this trade war. The change in the log of Vietnamese exports to the US from 2017 to 2020 is used to measure the impact of the trade war, and the change in the log of Chinese exports to the US is then used as an instrument for the Vietnamese export change during the same period. It is found that firms that faced more trade war exposure increased their investment, profit, and value added, which may be due to the market exit of unproductive firms. Moreover, the trade war impact is more pronounced for large firms. Foreign-invested firms gained less from trade war exposure. The pandemic weakened the trade war effect on firm performances; however, it exacerbated the trade tension effect on foreign-trade firms.

# Global Value Chain Disruptions and Firm Survival During COVID-19: An Empirical Investigation

ERIA Discussion Paper 2023 No. 485

By Sasidaran Gopalan, Ketan Reddy

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Despite the rapid acceleration of countries participating in global value chains (GVCs) over the last three decades, global GVC participation rates have plateaued since the global financial crisis (GFC) and worsened with the onset of the coronavirus disease (COVID-19) pandemic. The massive supply chain disruptions induced by the pandemic not only appeared to expose the vulnerabilities of GVCs, largely because of concentration risks, but also contributed to a dramatic decline in trade flows globally. As countries around the world emerge from the shadows of the pandemic, there is growing academic and policy interest in deciphering how countries should build effective strategies that facilitate firm survival, especially viewed from the lens of resilience and robustness. Considering this background, in this paper, we propose to make a twofold contribution to this literature. First, we undertake a comprehensive firm-level investigation (in a cross-country setting) to ascertain whether firms engaged in GVCs relative to non-GVC firms exhibited better survival instincts during the COVID-19 pandemic. Second, we uncover the heterogeneity of the shock across sectors and industries, considering the varied sectoral/industrial exposure to the COVID-19 pandemic. We document that GVC firms showcased greater robustness and resilience during the pandemic phase compared with other firms. Our results also show that the degree of resilience and robustness varies significantly by industry.

# Global Value Chain Integration and Business Cycle Synchronisation: Evidence from Selected ASEAN Countries

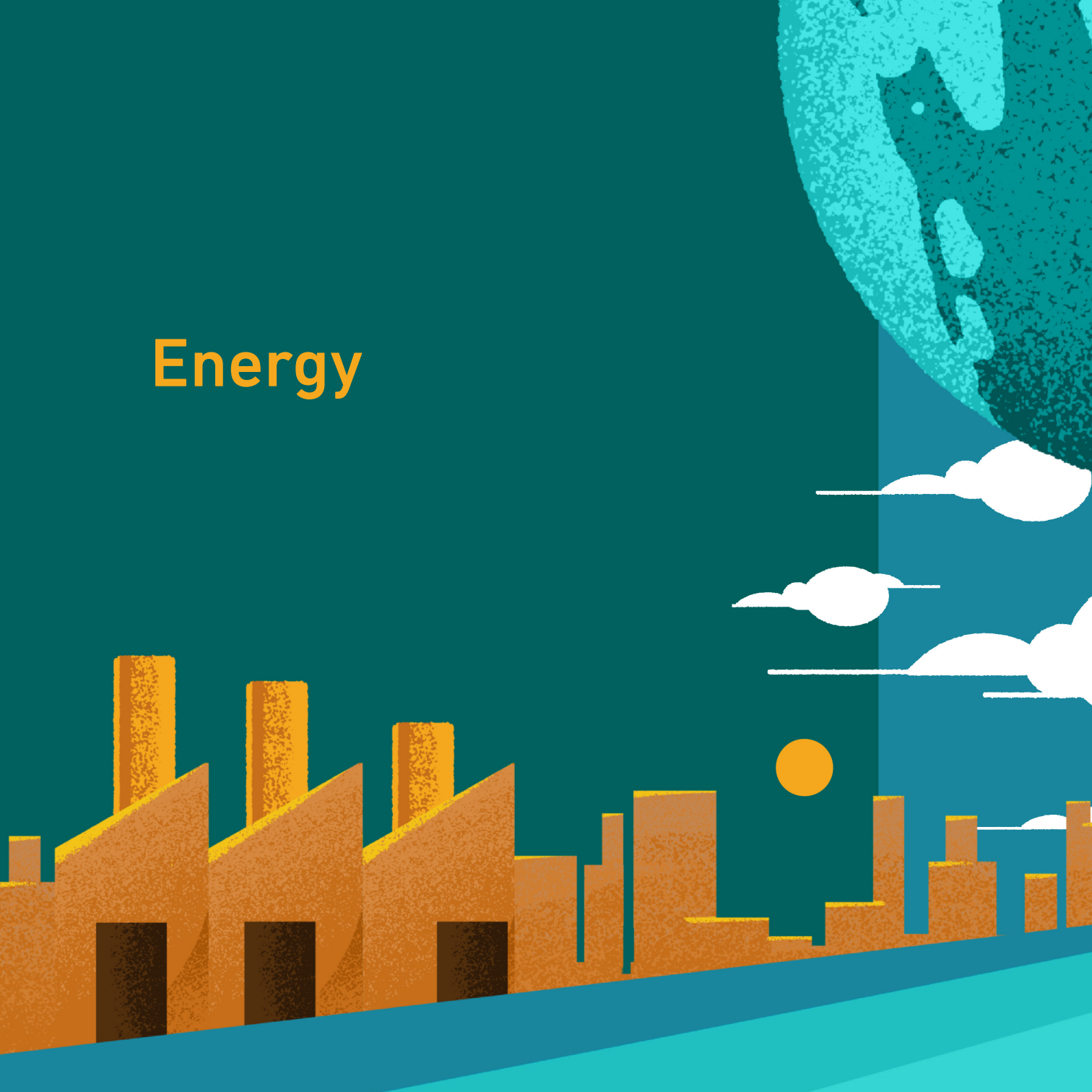
ERIA Discussion Paper 2023 No. 500

By Bhushan Praveen Jangam, Badri Narayan Rath

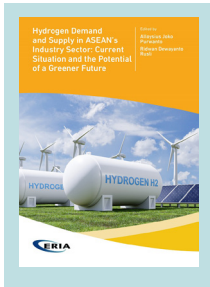
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This study examines the relationship between global value chain (GVC) integration and business cycle synchronisation in selected Association of Southeast Asian Nations (ASEAN) countries from 2007 to 2021. Using a panel fixed effects approach, we discover the following key findings: First, we find that GVC integration is associated with both output synchronisation and desynchronisation in ASEAN countries. Second, we notice that the outcomes differ depending on the type of GVC integration, such as forward integration, backward integration, or two-sided integration. Third, for a more in-depth understanding, we conduct an industry-specific analysis. We examine three major industry categories: manufacturing, services, and high-technology industries. The findings show mixed evidence of an association between GVC integration and BCS in these industries. The findings highlight the shock transmission associated with GVC integration.

# Energy







## Hydrogen Demand and Supply in ASEAN's Industry Sector

Edited by Alloysius Joko Purwanto and Ridwan Dewayanto Rusli

The pressing challenges of climate change and the global shift towards sustainable energy have elevated the significance of research and development in clean energy. Amongst the focal points of this transition, hydrogen has emerged as a key player, driving discussions and strategies towards achieving sustainable energy goals.

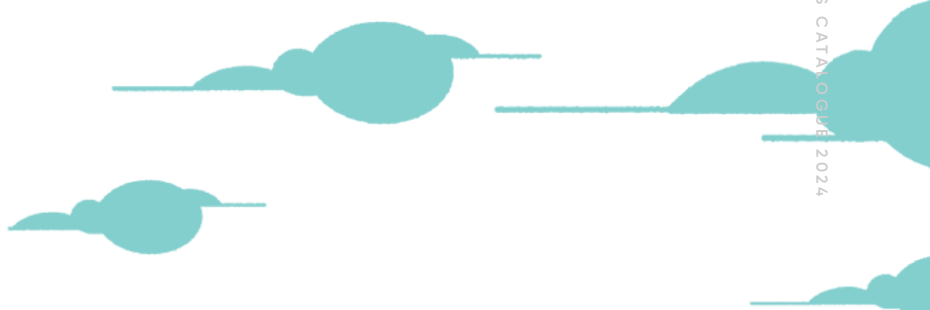
As we navigate towards a net-zero future in the coming decades, it becomes evident that hydrogen will play a pivotal role. While discussions often center around its application in the transport sector, the industrial landscape is poised to be the primary consumer of hydrogen, surpassing its use in transportation. Additionally, the exploration of hydrogen as an energy carrier and co-fuel in natural gas power generation is still in the experimental phase.

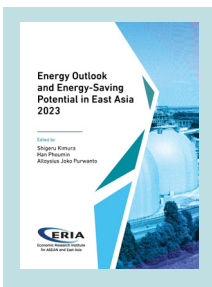
This comprehensive study delves into the analysis of hydrogen's role as a feedstock in critical industries such as oil refining, methanol production, ammonia synthesis, and iron and steel manufacturing within the ASEAN countries and the broader region. The analysis extends its scope to project potential scenarios until the year 2050, aligning with the diverse climate ambitions of the region.

Moreover, the book not only addresses the technical aspects but also delves into the economic and political dimensions of hydrogen utilisation. This holistic approach enables the formulation of robust

policy recommendations aimed at reducing the carbon intensity associated with hydrogen use as a feedstock in the industrial sectors of ASEAN countries.

In essence, this book serves as a vital resource for policymakers, industry stakeholders, and environmental advocates, providing valuable insights and recommendations to foster a more sustainable and low-carbon future in ASEAN's industrial landscape.





## Energy Outlook and Energy Saving Potential in East Asia 2023

Edited by Shigeru Kimura, Han Phoumin, Alloysius Joko Purwanto

From COP 26 to COP 27, countries have made ambitious pledges towards achieving Net-Zero Emissions by the mid-century. However, the recent oil and gas price hike due to the Russia–Ukraine War poses challenges to fuel switching from coal to natural gas, which is a crucial mitigation opportunity for the fossil fuel-dependent ASEAN and East Asia region. As a result, fossil fuel, especially coal, might persist longer than anticipated in the Asian energy mix for some countries.

Amidst these complexities, decarbonisation pathways must consider various socio-economic and political circumstances that can facilitate countries in reaching carbon neutrality. To address this, the study explores a scenario called 'Low Carbon Energy Transition (LCET)'; a carbon-neutral scenario that analyses the impacts of Net-Zero Emission (NZE) technologies to help countries achieve carbon neutrality by 2050 or beyond.

By employing energy modelling techniques, the study presents recommendations on how the region can best achieve carbon neutrality by 2050. The findings shed light on crucial policy implications for decision-makers, ensuring that the region can achieve economic growth and investment opportunities while safeguarding energy security and addressing environmental concerns. The study highlights the need for multiple pathways in the low carbon energy transition, empowering countries to embark on their journey towards carbon neutrality by 2050.

## Strategic Oil Stockpiling in Myanmar

ERIA Research Project Report 2023 No. 1

Edited by Shigeru Kimura, Tetsuo Morikawa

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Myanmar currently meets 96% of its domestic petroleum demand through imports, with most of it used for industry and transport. This makes oil supply to Myanmar vulnerable to accidents, natural disasters, and geopolitical conflicts. Strategic oil stockpiling, therefore, is an important option for Myanmar. There are several types of stockpiling measures – ticket, joint, underground, onshore, and offshore tanks. Considering the cost of stockpiling, this report recommends to first facilitate ticket with foreign countries, second use joint stockpiling in collaboration with other ASEAN Member States and middle eastern countries such as Saudi Arabia, and finally engage in physical stockpiling using underground, onshore, and offshore tanks. Regarding the volume of stockpiling, this report recommends increasing the current private stock level of 34 days to 45 days of public–private stock by 2030 and to 60 days by 2040. The portion of public stock should be 20 days by 2040.

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## Renewable Energy Transition in South Asia: Role of Regional Energy Trade

ERIA Research Project Report 2023 No. 10

Edited by Saswata Chaudhury, Raktimava Bose, Debanka Samanta, Venkatachalam Anbumozhi

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Renewable energy encompasses energy derived from sources that can be naturally replenished, falling into five primary categories: biomass, geothermal, hydropower, wind, and solar. This report delves into the implications of regional energy trade on augmenting the proportion of renewable energy consumption within the overall energy usage or the shift away from fossil fuel-centric economies in South Asia. The study employs data from seven nations, employing the Global Trade Analysis Project (GTAP) model to evaluate the consequences on economic growth and societal well-being within these analysed countries.

Furthermore, it examines the most effective policy measures, as observed in Southeast Asia's integration efforts. The analysis findings underscore that despite the environmental and societal welfare benefits linked with the transition to renewable energy, the region's trade competitiveness experiences a downturn due to decreased exports and amplified imports in the short and medium terms. This situation can be attributed, at least in part, to the cost-intensive nature of utilising renewable energy sources.

Nonetheless, given the invaluable socio-economic advantages tied to renewable energy adoption, a range of policy recommendations have been put forth. These measures aim to reduce the unit cost of renewable energy, enhancing the competitive edge of South Asian nations in the regional market and bolstering energy security post the adoption of increased renewable energy sources. Amongst these strategies are the implementation of carbon pricing policies, fostering innovation and research and development, and other pertinent initiatives.

Enhancing energy efficiency on the demand side, coupled with robust encouragement of renewable energy adoption on the supply side, stands as an imperative for expediting the sustainable energy transition across South Asia. It's worth noting that adept demand management could facilitate large-scale renewable production, thereby driving down unit costs through economies of scale. Ultimately, this approach can mitigate the adverse export-related ramifications of renewable energy utilisation.



# Study on Green Hydrogen Production in Brunei Darussalam

ERIA Research Project Report 2023 No. 12

Edited by Department of Energy, Prime Minister's Office, Brunei Darussalam, ERIA

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While Brunei Darussalam has long been renowned for its oil and gas production and export, it is now embracing a shift towards carbon neutrality by 2050. To achieve this goal, Brunei must transition from oil and gas to clean fuels, such as hydrogen, for both production and export.

Producing green hydrogen will require harnessing renewable energies, but Brunei's solar Photo Voltaic (PV) potential is limited due to its land area constraints. Floating solar PV (FSPV) is an option, but the water surface in Brunei is also limited. Therefore, the production of blue hydrogen from natural gas will remain a crucial alternative for Brunei.

The estimated production cost of green hydrogen in Brunei ranges from US\$3.5 to \$5.2 per kg-H<sub>2</sub>, slightly higher than the global target of US\$1 to \$2 per kg-H<sub>2</sub>. Hence, reducing the production cost of green hydrogen will be vital, achieved through adopting lower-priced solar PV systems and improving the efficiency of electrolysis technology.

The green hydrogen industry in Brunei will necessitate significant investment, but it will also yield numerous benefits, including the creation of skilled labour opportunities and economic growth through the country's macro economy. Embracing green hydrogen will play a pivotal role in Brunei's journey towards carbon neutrality, ensuring a sustainable and cleaner future for the nation.

# Assess EE&C Indicators and Policies to Ensure a Low Carbon Development Path

ERIA Research Project Report 2023 No. 13

Edited by Masaru Kawachino, Mitsuru Motokura, Han Phoumin

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ASEAN countries are actively promoting energy efficiency policies to address the rising energy consumption accompanying economic development. However, over the 2-decade period from 2000 to 2020, nations with substantial populations and economies, such as Indonesia, Malaysia, the Philippines, and Viet Nam, made consistent progress in enhancing energy efficiency. Regrettably, during this period, their carbon intensity deteriorated, signifying an increase in CO<sub>2</sub> emissions despite advancements in energy conservation.

This report delves into an analysis of the status of energy efficiency, carbon intensity, and other contributing factors in the target countries. It aims to pinpoint the underlying causes for the discrepancy between improvements in energy efficiency and the worsening of carbon intensity. Additionally, it examines challenges related to energy efficiency policies and provides policy recommendations with a focus on fostering low-carbon development.

# Conducting Energy Consumption Survey and Establishing Energy Efficiency Indicators for the Industrial and Commercial Sectors of the Philippines

ERIA Research Project Report 2023 No. 15

Edited by Shigeru Kimura, Leong Siew Meng, Citra Endah Nur Setyawati

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The Philippines has witnessed a significant surge in energy demand, particularly in electricity, between 1990 and 2019, primarily attributed to remarkable economic growth during that period. According to the latest EAS energy outlook updated by ERIA, it is projected that the Philippines' energy demand will expand more than threefold by 2050.

In response to this growing energy demand, the Department of Energy, Philippines (PDOE), took a proactive step by enacting the 'Energy Efficiency and Conservation Act' in April 2019 to promote energy-saving practices compared to Business As Usual (BAU). However, one notable challenge is the absence of energy efficiency indicators, which could serve as benchmarks across different final sectors.

Recognising this gap, PDOE reached out to ERIA with a request to develop Energy Efficiency Indicators (EEI) for the industry (factories) and commercial (buildings) sectors. ERIA subsequently engaged local consultants to conduct comprehensive energy consumption surveys within these sectors to estimate their EEIs. However, the process was prolonged due to the limited expertise and experience of the consultants, especially in data validation.

Nonetheless, after rigorous efforts, ERIA has now prepared EEIs for select factories and buildings, which can serve as benchmarks for energy efficiency. ERIA anticipates that PDOE will utilise these EEIs to assess the outcomes of Energy Efficiency and Conservation (EEC) action plans in accordance with the EEC ACT.



# Analysis of Future Mobility Fuel Scenarios Considering the Sustainable Use of Biofuels and Other Alternative Vehicle Fuels in East Asia Summit Countries - Phase III

ERIA Research Project Report 2023 No. 16

Edited by Venkatachalam Anbumozhi, Shinichirou Morimoto, Shabbir Gheewala, Nuwong Chollacoop

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The broader adoption of non-fossil fuel vehicles, such as those running on biofuels and electric power, is intricately connected to the achievement of Sustainable Development Goals (SDGs), notably Clean Energy Access (SDG 7), Sustainable Consumption (SDG 12), and Climate Change Mitigation (SDG 13). Conversely, the growing demand for electric vehicles as a replacement for internal combustion engine vehicles has led to an increased use of valuable raw materials.

This report presents the findings of a comprehensive 3-year study that focuses on the potential trade-offs that East Asia Summit (EAS) countries might encounter in the future. It assesses existing biofuel policies and implementation plans while estimating the 'well-to-tank' and 'tank-to-wheel' carbon emissions associated with biofuel usage and the mineral resources required for electrifying the mobility sector. Taking into consideration factors such as biofuel feedstock accessibility and mineral resource availability, the report also delves into the policy implications for pricing electric vehicles, developing associated infrastructure facilities, and devising new taxation systems.

## Oil and Gas Strategic Pricing in Myanmar

ERIA Research Project Report 2023 No. 2

Edited by Shigeru Kimura, Takahisa Hiruma, Hiroshi Hashimoto, Citra Endah Nur Setyawati

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As Myanmar's crude oil production has been far too limited to meet domestic petroleum demand, it has had to rely mostly on importing petroleum products, mainly from Singapore. If Myanmar constructs a refinery, Myanmar's petroleum market will have two types of petroleum products – domestic and import. So it will need a petroleum pricing system to integrate the domestic and import prices. Myanmar's gas production is forecast to decline in the years ahead. Hence, Myanmar will need to import gas, especially liquid natural gas (LNG) for internal use, i.e. for power generation and industrial activities. Myanmar, therefore, will need a unique gas pricing system to reflect domestic and imported gases. This report seeks to provide Myanmar with suggestions for formulating new oil and gas pricing systems.

## Potential Utilisation of Fuel Ammonia in ASEAN Countries

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ERIA Research Project Report 2023 No. 20

Edited by Yoshikazu Kobayashi

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Utilising fuel ammonia offers a viable solution for reconciling the decarbonisation and economic development goals of ASEAN countries. As many nations maintain coal-fired power generation, transitioning to co-fired ammonia can aid in curbing carbon emissions without extensive modifications to current setups.

This study assesses the demand for fuel ammonia in ASEAN, explores projected power supply costs, and suggests policy measures to hasten its adoption. It further reviews advancements in co-firing technologies and ongoing efforts in ammonia supply chain development within the ASEAN power sector.

## Effectiveness of the Hybrid System Combining Hydropower and Floating Solar in Lao PDR

ERIA Research Project Report 2023 No. 25

Edited by Shigeru Kimura, Kei Sudo, Alexander Ryota Keeley, Kento Komatsubara

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The Lao People's Democratic Republic (Lao PDR) boasts abundant hydropower resources. However, during the dry season, the nation grapples with an electricity shortage from hydropower plants due to diminished water flow. Consequently, there is a reliance on importing electricity from Thailand. A plausible solution to this challenge involves the installation of a solar photovoltaic (PV) system, particularly effective during the dry season. However, solar PV exhibits intermittency, a low capacity factor, relatively high generation costs, and seasonality. Therefore, it is imperative to assess the viability of solar PV installation using a power generation simulation approach based on hourly solar irradiation data. This study endeavours to evaluate and assess the effectiveness of solar PV as a potential complementary power source to hydropower plants. The assessment assumes a hybrid system that combines hydropower with a floating solar PV system placed on the surface of the hydropower dam.

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## Economic Impact of the Early Retirement of Fossil Power Plants

ERIA Research Project Report 2023 No. 26

Edited by Ichiro Kutani, Yoichi Namba, Han Phoumin

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Addressing climate change necessitates a prompt reduction in fossil fuel consumption; however, this imperative may conflict with investment considerations. For example, project owners or financiers may incur losses if existing fossil power plants cease operation before their investments are recovered. ASEAN Member States have witnessed the construction of numerous young fossil power plants to meet escalating electricity demand. The premature retirement of such recent investments could result in economic losses, impacting a country's overall economy.

The analysis indicates that the early retirement of existing fossil power plants carries substantial economic implications. Under the assumed conditions, a reduction in the operational period by 15 years could lead to losses equivalent to a significant percentage of the GDP. Theoretically, these losses could be offset by higher carbon prices. In such a scenario, the carbon price should be approximately US\$50–US\$60 per tonne of CO<sub>2</sub> for coal-fired power and about US\$100 per tonne of CO<sub>2</sub> for gas-fired power. Based on these analyses, the study proposes three policy recommendations:

1. **Careful Consideration of Early Retirement Policies:**  
Implementing policies for the early retirement of existing fossil power plants should be approached with careful consideration, given the potential economic consequences. Decision-makers must balance environmental goals with the economic impact on investments and overall national economies.
2. **Carbon Pricing as Compensation Mechanism:**  
Carbon pricing can serve as a mechanism to compensate for the anticipated economic losses stemming from the early retirement of fossil power plants. Setting appropriate carbon prices, such as \$50– \$60 per tonne of CO<sub>2</sub> for coal-fired power and \$100 per tonne of CO<sub>2</sub> for gas-fired power, could help offset financial impacts.
3. **Preservation of Energy System Resilience:**  
Measures should be taken to prevent a reduction in the energy system's resilience due to the potential loss of diversity resulting from early retirements. Balancing the transition to cleaner energy sources with the need to maintain a diverse and resilient energy system is crucial for long-term sustainability.

# Effective Management of Methane Emissions in ASEAN

ERIA Research Project Report 2023 No. 28

Edited by Hiroshi Hashimoto

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The issue of methane emissions has garnered increased attention in recent years, with a focus on the natural gas value chain as a 'low-hanging fruit' for emission reductions. This emphasis has grown significantly, especially after the global gas crisis in 2022, highlighting the importance of sustainability in natural gas supply alongside considerations for supply security. The objective of this study is to formulate a resilient strategy addressing the methane emission issue throughout the natural gas value chain, particularly in the ASEAN region — a pivotal player in the global natural gas business.

Key recommendations of the study revolve around several crucial issues. These include highlighting ASEAN's influence in global methane emissions management and energy security, emphasising the need to standardise and harmonise methane emission measurement guidelines to enhance accuracy and management, and recognising the valuable role of Japanese companies' expertise in expediting methane emissions management in the ASEAN region.

## Mitigating Extreme Volatility of LNG Prices in ASEAN: Impacts of High LNG Prices on Southeast Asia

ERIA Research Project Report 2023 No. 29

Edited by Han Phoumin, Hiroshi Hashimoto

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Between 2020 and 2023, the liquefied natural gas (LNG) market witnessed significant fluctuations, with prices oscillating between historic lows and unprecedented highs. Although prices have stabilised somewhat since late 2022, the potential for resurgence remains, posing challenges for Asian economies reliant on spot LNG purchases. This study delves into the causes and consequences of this volatility in the ASEAN region and its neighbouring areas, shedding light on its ramifications for various stakeholders. Additionally, it explores the role of LNG supply from the United States, a key factor shaping global LNG markets. The report seeks to identify strategies for mitigating LNG price volatility, particularly within ASEAN. It advocates for measures to secure reliable long-term supply, enhance contract terms, and achieve a balance between energy security, affordability, sustainability, and the imperative of energy transition. Through comprehensive analysis and policy recommendations, this study aims to foster stability and sustainable growth in the ASEAN LNG market.

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## Decarbonisation of ASEAN Energy Systems: Optimum Technology Selection Model Analysis up to 2060 – Updated 2023

ERIA Research Project Report 2023 No. 30

Edited by Seiya Endo, Soichi Morimoto, Hideaki Obane, Kei Shimogori, Ichiro Kutani, Toshiyuki Sakamoto, Shigeru Kimura

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Achieving carbon neutrality involves the strategic selection of low or zero-carbon fuels and technologies. However, the prioritisation of these options should be contingent upon economic considerations, specifically targeting cost reduction. This study employs an optimisation approach utilising LP code to determine the most economically viable pathways.

Given the diverse economic development levels, land areas, and available natural resources such as fossil fuels and renewable energies amongst ASEAN countries, the selection of low or zero-carbon fuels and technologies should be tailored to the unique characteristics of each nation. Consequently, this study aims to develop a carbon-neutral roadmap that takes into account the specific attributes of each ASEAN country.

Furthermore, the research extends its scope to conduct a comparative analysis between the Announced Pledges Scenario (APS) outlined by the International Energy Agency (IEA) and the Carbon Neutral Roadmap for ASEAN developed by ERIA (Economic Research Institute for ASEAN and East Asia) and the Institute of Energy Economics, Japan (IEEJ). The intention is to assess the disparities and similarities between these approaches.

In addition to evaluating the aforementioned scenarios, the study looks towards the future by considering the potential expansion of this approach to Southwest Asia, with a specific focus on India. This broader perspective aims to contribute insights into achieving carbon neutrality in diverse regional contexts.

## Reuse of Electric Vehicle Batteries in ASEAN

### ERIA Research Project Report 2023 No. 31

Edited by Naoko Doi, Alloysius Joko Purtanto, Shigeru Suehiro, Soichi Morimoto, Akira Takamine, Yasuo Kawada, Koichi Sasaki and Yuhji Matsuo

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Indonesia aims to transition to a more balanced energy mix structure, targeting a renewable share of 23% by 2025 and 31% by 2050. One strategic approach to meet these goals involves promoting the use of biofuels in the road transport sector. This study assesses the potential advancement of various biofuel blends in Indonesia, considering diverse economic and energy market scenarios, as well as the techno-economic development of different biofuel types and associated road vehicle propulsion technologies.

The study provides a framework for policy recommendations geared towards optimising the penetration level of biofuels up to 2040. Key principles within this framework include the consideration of economic and energy sector development, the imperative to achieve higher Euro standard levels in Indonesia's transport fuel, the pivotal role of financing strategies, and the ongoing progress of both biofuel and propulsion technology development.

## **Study on the Applicability of CCT for a Comprehensive and Optimal Carbon-neutral Solution in ASEAN**

ERIA Research Project Report 2023 No. 4

Edited by Yamada Fumiko, Murakami Kazuyuki, Han Phoumin

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The increasing electricity demand in the ASEAN region, driven by steady economic growth, necessitates a well-balanced and optimal generation mix of coal, gas, and renewables to meet the surging demand.

While ASEAN is committed to the development of renewable energy sources as part of the energy transition to reduce emissions, it recognises that renewables alone may not be sufficient to support sustained growth and ensure a sustainable energy supply for further development. Therefore, it is important for ASEAN to pursue an approach that includes all available fuels, including coal, and accelerate the deployment of cleaner coal technologies (CCT) and carbon capture and utilisation (CCU) solutions through relevant policy formulation.

This study focuses on carbon-neutral solutions involving applicable CCT and CCU technologies, with specific consideration given to four target ASEAN Member States: Indonesia, Malaysia, Thailand, and Viet Nam. The aim is to identify technology options that align with each country's specific circumstances and develop tailored approaches for achieving carbon neutrality. Realistic solutions, such as biomass and/or ammonia co-firing at existing coal-fired power plants, can be pursued alongside the development of other technology options for carbon neutrality.



Comprehensive development of the entire value chain, market, and relevant policies is crucial for the successful integration of emerging energy technologies, including CCUS. The recovery of CO<sub>2</sub> has become a significant issue in both the power and industrial sectors, necessitating cross-sectoral cooperation. Policy initiatives supporting such collaborative activities and a financing scheme that encompasses the entire carbon-neutral project are essential for progress.

International collaboration and intra-ASEAN cooperation are valuable for studying the applicability and implementation of specific carbon-neutral technologies, and should be pursued for mutual benefit. Key considerations for ASEAN include measures for grid system stabilisation, recognising that coal-fired power plants can contribute to the energy transition with appropriate measures, fostering enhanced collaboration and cooperation, addressing waste management as a crucial issue, and establishing a new, cross-sectoral platform dedicated to ASEAN decarbonisation.

In summary, this study provides recommendations for ASEAN, emphasising the importance of tailored technology options, comprehensive development, cross-sectoral cooperation, financing mechanisms, international collaboration, and a dedicated platform for decarbonisation efforts. These considerations will contribute to a sustainable and efficient energy transition in the ASEAN region.

# Health and Ageing Society



# Health Economic Alternatives for Future Pandemic Travel

## ERIA Policy Brief 2023 No. 13

By Antonio Fredelindo Dela Resma Villanueva, Norio Ohmagari, Septelia Inawati, Adeeba Kamarulzaman, Regina Berba, Paulyn Ubial, Chokephaibulkit Kulkanya, Asuka Nagatani, Takuma Kato

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Global efforts to control the coronavirus disease (COVID-19) pandemic have had a major impact on the international travel industry. For the most part, fortunately, these efforts have evolved into solutions that now focus on balancing health and the economy.

Regional pandemic experts who have been directly involved in the development and implementation of COVID-19 policies within the Economic Research Institute for ASEAN and East Asia (ERIA) member countries were interviewed to share their opinions and experiences, particularly regarding travel. In this policy brief, medical experts from Indonesia, Japan, Malaysia, the Philippines, and Thailand reveal their national best practices based on their local evidence base.

Thereafter, alongside information from other ERIA members, including Cambodia, China, India, and Singapore through the ERIA Healthcare Unit's webinar series on 'Pandemic Best Policy Strategies: Balancing Health and Economy', recommendations for future pandemic best practices for travel are considered.

## **Towards Progress in Population Health and Health Equality in the Asian Region**

ERIA Research Project Report 2023 No. 3

Edited by Haruka Sakamoto, Haruyo Nakamura

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Universal health coverage (UHC) envisions that everyone has access to a comprehensive range of high-quality health services, without facing financial hardships, precisely when and where they need them. The global objective of achieving UHC by 2030, as outlined in the Sustainable Development Goals (SDGs), is currently being pursued by countries worldwide. However, the current status and challenges encountered on the path to UHC differ across nations. This report offers a comprehensive overview of the progress made by Asian countries in their journey toward UHC. Furthermore, it aims to facilitate the acceleration of UHC efforts by sharing specific examples drawn from past experiences, thus providing valuable insights and lessons for countries aspiring to expedite their own progress in this critical endeavour.

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## **Human Resource Development, Employment, and International Migration of Nurses and Caregivers in Asia and the Pacific Region**

ERIA Research Project Report 2023 No. 7

Edited by Yuko Tsujita, Takuma Kato

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The population in Asia is ageing, resulting in an increased demand for nurses and care workers. Consequently, the capacity of healthcare and long-term care needs to be expanded for treating this population in Asia. As some countries cannot meet this increasing demand domestically, they seek to recruit nurses and care workers from overseas. Against this backdrop, this study explores how both 'exporting' and 'importing' countries of migrant workers in the health and long-term care sectors can achieve a mutually beneficial situation in the post-COVID-19 pandemic era. Accordingly, it is important to understand the dynamically changing situations and challenges in terms of training and employment of nurses and care workers in exporting and importing countries.

This study focuses on Asia as a major exporting region for nurses and care workers, with Cambodia, India, Indonesia, Malaysia, the Philippines, and Viet Nam representing the 'exporting' countries, while Australia, New Zealand, and Japan represent the 'importing' countries.

## **Resilient Long-term Care under the COVID-19 Pandemic in Indonesia, Japan, and Thailand**

ERIA Research Project Report 2023 No. 8

Edited by Takeo Ogawa, Takuma Kato, Asuka Nagatani

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The COVID-19 pandemic has brought attention to the vulnerabilities of long-term care systems in Indonesia, Japan, and Thailand. While institutional care serves as a means to provide standardised care services to older individuals, it also exhibits weaknesses that can contribute to outbreaks and the severity of infection clusters. Enclosed spaces within these facilities necessitate proper ventilation to prevent the spread of infectious diseases.

However, it is important to acknowledge that older persons in Indonesia and Thailand have been able to endure the COVID-19 crisis due to the unwavering dedication of their families and community volunteers. Their support has played a crucial role in safeguarding the well-being of older individuals during these challenging times.

To build resilient long-term care systems, we propose the development of training programmes aimed at enhancing the crisis response capabilities of caregivers and care workers, including migrant care workers. These programmes would focus on equipping them with the necessary skills and knowledge to effectively respond to crises and mitigate the spread of infections. Additionally, the establishment of business continuity management practices within long-term care providers should be prioritised, aiming to foster a community integrated care system.

# Development and Assessment of a Meal Assistance and Oral Care Module for Care Workers in Asian Countries

ERIA Research Project Report 2023 No. 9

Edited by Yuko O. Hirano

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This study investigates the effectiveness of meal assistance and oral care checklists developed during the previous ERIA project (FY 2018–2019). The research involved multiple stages, including field data collection to assess the physical and mental conditions of older adults in Indonesia, enabling the development of an oral care module. Subsequently, an oral care module was created based on the previous stage's outline and distributed to participants in a 2-day intervention study.

**Methods:** Field data collection involved the assessment of physical and mental conditions, as well as oral and swallowing functions of the target population, which provided essential insights for designing the oral care module. The module, presented in a handbook format, was distributed to 17 care workers from private long-term care institutions and 22 care workers from government-owned long-term care institutions.

**Results:** The intervention study revealed significant improvements in knowledge scores amongst the trainees before and after the training, regardless of the demographic characteristics of the study groups. These findings validate the efficacy of the training module in enhancing care providers' knowledge and skills.

**Conclusion:** The study's results hold promise for the development of a policy brief, which could facilitate appropriate care for older adults in Indonesia. The government and long-term care providers can benefit from these insights, making informed decisions and implementing effective care practices.

# Industry and Manufacturing





## Viet Nam 2045: Development Issues and Challenges

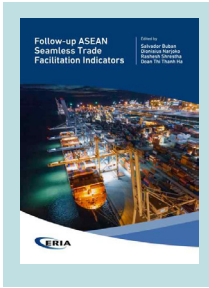
Edited by Fukunari Kimura and the Viet Nam 2045 team

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Viet Nam's impressive economic growth has been driven by a socialist-oriented market economy often recognised as the 'Viet Nam model.' This model, in combination with an open-door policy promoting economic integration with regional and global partners, has been pivotal in shaping the country's advancement. Notably, Japan's Official Development Assistance has played a central role in improving infrastructure to attract foreign direct investment, thereby reinforcing the expansion of exports.

With the goal of achieving high-income status by 2045, Viet Nam must navigate a trajectory of consistent growth, aiming to surpass an annual growth rate of 5.4% leading up to 2045. In this pursuit, this publication highlights seven critical sectors poised to guide this growth. Amongst them, the digital business sector emerges as supremely significant. The wave of digital transformation acts as a pervasive catalyst for innovation, a cornerstone in Viet Nam's endeavour to break free from the middle-income trap. In the drive towards sustainable industrialisation, Viet Nam faces two challenges: firstly, the necessity of combating climate change and embracing green transformation – this involves ensuring a robust energy supply while adhering to a carbon-neutral framework. Secondly, fostering social inclusion to nurture a burgeoning middle class is equally vital. As we commemorate the 50th anniversary of diplomatic relations between Viet Nam and Japan, this publication delves deep into the economic synergy between the two nations. With a primary focus on digital transformation and green transition, it illuminates the dynamic cooperation between Viet Nam and Japan that paves the way for a promising future.





## Follow-up ASEAN Seamless Trade Facilitation Indicators

Edited by Salvador Buban, Dionisius A. Narjoko,  
Rashesh Shrestha, Doan Thi Thanh Ha



The second ASEAN Seamless Trade Facilitation Indicators (ASTFI) and the Trade Transactions Cost (TTC) study, known as ASTFI-TTC II, is a follow-up report to the baseline ASTFI-TTC publication from July 2021, which was based on data gathered in 2019. These studies are aimed at improving our understanding of the trade facilitation and trade transactions costs landscape within the ASEAN Member States. They document the progress achieved, while also pinpointing areas where improvement in trade facilitation is required.

The findings of this study highlight significant progress made by ASEAN Member States in continuously improving the trade facilitation environment within the ASEAN region by incorporating many prescribed elements of trade facilitation. The reforms implemented since 2019 include expanded utilisation of technology to improve efficiency by inclusion of additional trade-related government agencies into the National Single Windows, greater acceptance of electronic transactions, increased transparency through the publication of permit and license requirements on government agency websites and trade portals, and enhanced coordination amongst government agencies.

It is noteworthy that these reforms have been introduced amidst the disruption in goods trade due to the COVID-19 pandemic, which necessitated adoption of alternative processes. A rapid adoption of digital technology in trade processes proved to be a silver lining. Furthermore, the implementation of the Regional Comprehensive

Economic Partnership (RCEP) has strengthened commitments to trade facilitation, thereby promoting further international trade amongst countries in Southeast and East Asia. Expediting the movement, release, and clearance of goods, including goods in transit, is pivotal for sustaining the liberalisation of ASEAN economies. This is particularly beneficial for smaller businesses since trade costs are more burdensome at smaller trade volumes. Thus, such initiatives empower countries to ensure growth and prosperity on a broader scale. Going forward, modern technology such as artificial intelligence, natural language processing, and big data analytics could be utilised for trade facilitation to promote multilateralism and closer economic integration.

## **Cogeneration Potential in Indonesia's Industry Sector with Reference to Japan and Malaysian Experiences**

ERIA Research Project Report 2023 No. 14

Edited by Shigeru Kimura, Setsuo Miyakoshi, Leong Siew Meng, Luk Chau Beng

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Thermal power plants utilise fossil fuels to generate electricity, with a significant portion of the heat produced being released into the atmosphere as waste. The concept of a cogeneration system revolves around the recovery of this waste heat for on-site use, fulfilling heat demands at the same location as the cogeneration system. Consequently, cogeneration systems are expected to exhibit high thermal efficiency, ranging from 60% to 80%, surpassing the efficiency of standalone thermal power plants.

Furthermore, cogeneration systems have the potential to conserve energy and reduce CO<sub>2</sub> emissions by reducing the need for additional fuel combustion to meet heat demands. This makes cogeneration systems a remarkable technology, contingent on the availability of simultaneous electricity and heat demand at a single site. Without a concurrent heat demand, cogeneration systems are inoperable.

In an effort to explore the applicability of cogeneration systems to the Indonesian industrial sector, this project aims to introduce case studies of cogeneration systems implemented in the industrial sectors of Japan and Malaysia, both of which are considered advanced in terms of cogeneration technology. This report encompasses 33 case studies of cogeneration systems across various industrial subsectors in Japan, along with 24 case studies from the Malaysian industrial sector.

The payback period for cogeneration systems appears promising, largely dependent on the cost of the heat recovery system and the benefits derived from energy consumption savings for heat demand. In the case of Malaysia, the payback period typically ranges from 3 to 7 years.

It's noteworthy that cogeneration systems are not limited to the industrial sector alone; they can also be applied within the commercial sector, specifically in commercial buildings. This presents a future challenge for ERIA.

# Foreign Direct Investment, Agglomeration, and Production Networks in Indonesian Manufacturing

ERIA Discussion Paper 2023 No. 473

By Dionisius A. Narjoko

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This study examines the importance of globalisation – defined by international production networks – in determining foreign direct investment (FDI) flows into Indonesian manufacturing since 2000. It is motivated by the fact that the extent of connection between the Indonesian and the global economy had increased after the 1997–98 Asian financial crisis. Models of FDI are estimated by utilising plant-level data and various trade and tariff data. Production networks or agglomeration are found to play an important role in driving FDI in Indonesia's manufacturing sector, at least for the period 2000–2015.

This study provides the insight that agglomeration could be utilised to increase FDI in Indonesia. This not only improves the productivity of the sector targeted by the investment but also promotes productivity growth. Creating more agglomeration areas could therefore be a policy direction taken by Indonesia to help increase FDI.

# Capital Cost, Technology Choice, and Demand for Skills in Industries in Viet Nam

ERIA Discussion Paper 2023 No. 479

By Diep Phan, Ian Coxhead

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This paper explores the consequences of a policy regime in which state firms enjoy privileged access to capital while private firms are crowded out. Consequently, state firms choose technologies that are capital-intensive and thus demand more skilled labour. Econometric estimates using Viet Nam's enterprise censuses confirm some of the propositions generated by the model. Relative to private firms, state firms have higher fixed capital stocks but do not have lower variable capital costs; they also employ more skilled labour. Also, as predicted, there is a U-shaped relationship between production scale and skills intensity; many private firms (which are mostly small) are limited to labour-intensive techniques and increase output simply by adding unskilled labour, whereas larger firms are more likely to operate at scales at which it is profitable to employ more skills-intensive and efficient technologies.

# Innovation and Technology





## Empowering Online Public Service in Asia: The Digital Frontier

Edited by Lurong Chen, Fukunari Kimura

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The implications of digital government are extensive and can profoundly shape the trajectory and character of digital transformation. Drawing from ERIA's recent research on digital transformation, this book provides valuable insights into the practices of Asian countries in harnessing the potential of digital government. It illuminates the use of policy instruments to cultivate a digitally-driven, people-centric public service system, fostering sustained regional development over the long term.



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## ASEAN's Digital Integration: Evolution of Framework Documents

By Ikumo Isono, Hilmy Prilliadi

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This book explores the evolution of ASEAN policies and initiatives on the digital sector and digital economy and identifies the characteristics of ASEAN's digital integration as an element of the regional integration process. It outlines important milestones, such as the e-ASEAN Framework Agreement in 2000, ASEAN Economic Community Blueprint in 2007, establishment of the ASEAN Coordinating Committee on Electronic Commerce in 2016, and ASEAN Digital Integration Framework Action Plan in 2019.



The book argues that ASEAN has updated the characteristics of the digital sector and its impact on society, broadened its scope, and concretised its actions. Distinctive initiatives such as the ASEAN Single Window; e-authentication and digital identity; ASEAN Computer Emergency Response Team; e-payment and QR codes; and digitisation of ASEAN micro, small, and medium-sized enterprises are presented. It also analyses the relationships and differences between the five comprehensive framework documents adopted during 2019–2021 and discusses the prospects of the ASEAN Digital Economy Framework Agreement and Post-2025 Agenda.

## **Understanding the ASEAN Digital Economy Framework Agreement: A Means to Support ASEAN Integration**

ERIA Policy Brief 2023 No. 1

By Mima Sefrina

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The coronavirus disease (COVID-19) pandemic has accelerated the importance of digital technologies in the economy, particularly in e-commerce and digital financial services. Recognising the importance of digital technologies for economic recovery, the Association of Southeast Asian Nations (ASEAN) leaders signed the Bandar Seri Begawan Roadmap in 2021, which laid the foundation for the integration of the ASEAN digital economy in three phases – recovery, implementation, and transformation – and affirmed their interest in the establishment of a Digital Economy Framework Agreement (DEFA). The DEFA aims to deepen existing digital economy cooperation and ensure the interoperability of digital economy systems. The formulation and signing of the DEFA will require the provision of flexible timelines and technical assistance, as the ASEAN Digital Integration Index shows that ASEAN is still in the early stages of digital economy development and that ASEAN Member States are at different levels of readiness for digital economy integration.



# Fostering ASEAN's Digital Future through Cybersecurity Policies and Human Empowerment

ERIA Policy Brief 2023 No. 2

By Michelle Chandra Kasih

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The adoption of advanced technology comes with the risk of cyberattacks. Despite the remarkable prospects of the digital economy, the cost of cyberattacks has reached millions of United States (US) dollars and is projected to increase. Investment is needed to provide cybersecurity to help secure the growth of the digital and sustainable economy and anticipate more advanced attacks. As investment in cybersecurity has started to grow in the Association of Southeast Asian Nations (ASEAN), challenges are present in the intangible form of in-existent or strict policies, skill shortages, and insufficient public awareness, which can halt the effectiveness of such investment. This policy brief proposes three policy recommendations to ensure successful investment in cybersecurity:

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1. Ensure that cybersecurity policies and legal frameworks are not underdeveloped or overly restrictive.
2. Support small businesses in earning customer trust through cost-effective guidelines. Incentivise and maintain partnerships for education, research, and capacity building with moral and ethical education for future experts.
3. Raise cyber hygiene and establish integrative reporting platforms that help people identify and detect cyber risk.

## ASEAN Digital Community (ADC) 2045

ERIA Policy Brief 2023 No. 7

By Lili Yan Ing, Imam Pambagyo, Yessi Vadila, Ivana Markus, Livia Feliciani Nazara

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Digital transformation has profoundly reshaped not only the way we work but also the way we live. It has shifted the focus of goods and services trade, emphasising not only what is produced and traded, but also how it is traded, customised, and delivered. The rapid digital transformation within the ASEAN region has ushered in an array of risks and challenges. These challenges encompass a spectrum of concerns, ranging from the safeguarding of data privacy and fortification against cyber threats to grappling with intensified competition and addressing the ever-widening digital divide. To fully embrace the opportunities presented by the digital age, ASEAN must lay the foundation for an ASEAN Digital Community (ADC) 2045, that can serve as a vision for ASEAN in embracing a new era. This visionary pursuit must be anchored in four pivotal cornerstones: robust data governance, the infusion of value-added principles, the establishment of seamless digital connectivity, and the propagation of digital inclusivity.



## Rethinking the Growth of Creative Economy in Indonesia: The Music and Gaming Sub-sectors

ERIA Research Project Report 2023 No. 11

By Isabelle Antunès

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This report presents a comprehensive analysis of the music and gaming sectors in Indonesia, aiming to provoke new perspectives and ideas. It explores the economic landscape of independent musicians and game developers, highlighting their strategies to capitalise on the opportunities presented by the digital economy. It also emphasises the pivotal role of entrepreneurship and financial inclusion in driving sectoral growth. Furthermore, the report advocates for the application of circular thinking in the creative economy, recognising the intrinsic value of creativity. By adopting a circular creative economy approach, products are designed with durability, reusability, and recycling in mind, fostering the emergence of new creations by other artists. Ultimately, this promotes the continuous advancement of creativity, ensuring the perpetual circulation of products within the economy.

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## Operational Technology Security in ASEAN

ERIA Research Project Report 2023 No. 19

Edited by Keita Oikawa, Yoichiro Hatakeyama

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This study focuses on Association of Southeast Asian Nations (ASEAN)–Japan cooperation in addressing operational technology security challenges during their 50th anniversary. Japanese multinational companies have established resilient international production networks (IPNs) in ASEAN, supporting the regional economy during the pandemic. However, supply chain digitalisation and increased security measures need attention for maintaining competitiveness. Operational technology security risks, regulatory disparities, and governance frameworks are global concerns in critical infrastructure digitalisation. Enhancing cyber-resilience across Asia, particularly in critical infrastructure and manufacturing supply chains, is crucial.

The research aims to bridge the gap between current and desired operational technology security states, propose policies, and contribute to ASEAN's cybersecurity readiness and sustainable IPNs through collaboration. While information and communications technology security awareness is rising in ASEAN, operational technology security remains insufficient, with only a few countries having initiated associated measures. Singapore has its own standards and product certification tied to government procurement, while Malaysia is adopting international standards.

Some companies prioritise operational technology security, while others face obstacles like digitalisation delays, cost, or lack of understanding. Coordinated efforts are needed for regional operational technology security enhancement. Japan can contribute by fostering operational technology security measures and developing a common ASEAN framework based on global standards. Collaboration and knowledge sharing amongst stakeholders can promote best practices. Supporting a common ASEAN company and product certification system, along with standardised procurement requirements, will strengthen regional coordination amidst expanding global supply chains.

## Vision for the Digitalisation of Supply Chains in ASEAN and Japan

ERIA Research Project Report 2023 No. 22

Edited by Keita Oikawa, Fumitaka Machida

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The Association of Southeast Asian Nations (ASEAN) has established competitive production networks with Japan. However, to maintain the competitiveness of these networks, ASEAN and Japan must effectively respond to global trends, including increasing and diversifying supply chain risks, achieving carbon neutrality, embracing circular economy principles, and addressing human rights issues. The key lies in facilitating effective data sharing across end-to-end supply chains. The European Union (EU) is currently advancing in the construction of data-sharing architectures such as the International Data Space and Catena-X. ASEAN and Japan should explore strategies to meet the growing demand for data-sharing across supply chains.

To facilitate data-sharing in Asia, ERIA has convened a discussion group comprised of private sector and academia representatives. This group aims to explore the reasons for companies to share data, the associated benefits, and strategies for enhancing business operations through data sharing. The vision outlined in this paper seeks to establish reliable supply chains characterised by transparency, connectivity, sustainability, and competitiveness, fostering collaboration between ASEAN and Japan. The goal is to address key challenges faced by ASEAN countries while promoting synergies between ASEAN and Japan. The realisation of this vision involves three main steps: (i) defining a clear mission and value proposition, (ii) identifying essential requirements and enablers, and (iii) developing specific use cases to achieve tangible benefits.

## **Technological Innovation and the Development of the Fuel Cell Electric Vehicle Industry Based on Patent Value Analysis**

ERIA Discussion Paper 2023 No. 477

By Yanfei Li, Jia Zhao, Jianjun Yan

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Currently, major economies are competing on the technological and industrial development of fuel cell electric vehicles (FCEVs). This paper discusses the relationship between the patent value of FCEVs and the commercialisation of this technology. First, the patent data of FCEVs are analysed, focusing on data of China, Germany, Japan, the Republic of Korea, and the United States. Then, the paper constructs the FCEV patent value index framework based on the technological value and economic value of patents. Finally, this paper conducts an empirical study to analyse the influence of patent value on the development of the FCEV industry. It is found that, under the current situation, individual patent value can significantly promote the development of the FCEV industry, whilst the gross patent value of a certain country even has a negative impact. In addition, the increase of hydrogen infrastructure, research and development expenditure, and market demand will significantly promote the development of the FCEV industry. The development level of related industries such as the battery electric vehicle industry and the reduction of environmental pollution are also significant drivers of the development of FCEVs.

## ASEAN Digital Community 2045

ERIA Discussion Paper 2023 No. 487

By Lili Yan Ing, Yessi Vadila, Ivana Markus, Livia Feliciani Nazara

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Over the last decade, the Association of Southeast Asian Nations (ASEAN) has undergone significant development in digitalisation. The rapid digital transformation in ASEAN, however, has brought forth risks and challenges encompassing data security, cybersecurity, competition, and the digital divide. To effectively address these challenges and leverage the potential of the digital realm, ASEAN developed nine frameworks during 2016–2023. Yet, the focus is primarily on digital trade. We suggest that ASEAN embrace digital transformation by establishing the ASEAN Digital Community (ADC) 2045. This vision could provide guidance to Member States, enabling them to overcome regional challenges and unlock their digital potential. It is crucial for ASEAN to nurture digital development across the three key pillars: political-security, economic, and socio-cultural dimensions. The three pillars should be built on four fundamental elements: data governance, value-added enhancement, improved digital connectivity, and digital inclusivity. Through the establishment of ADC 2045, ASEAN could position itself as a significant player in the global digital economy while ensuring that digital transformation aligns with its sustainable and inclusive development agenda.

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## Accelerating AI in ASEAN: Addressing Disparities, Challenges, and Regional Policy Imperatives

ERIA Discussion Paper 2023 No. 488

By Ikumo Isono, Hilmy Prilliadi

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Artificial intelligence (AI) is attracting significant attention worldwide in 2023 because of its potential to transform economies and societies. The Association of Southeast Asian Nations (ASEAN) must accelerate the debate on AI for five compelling reasons. First, narrowing the gaps in AI readiness within ASEAN is essential to share the benefits of AI equitably. Second, there are concerns that rapid advances in AI could result in job loss, and retraining is needed.

Third, AI systems must be developed from an ASEAN-centric perspective to overcome prejudice and align AI with ASEAN values. Fourth, as developed countries implement AI regulations, ASEAN needs to consider the need for its own regional policies. Finally, now is the perfect time to discuss the positioning of AI in the regional framework as ASEAN's digital integration initiative progresses. The paper discusses the significance of AI in 2023, the challenges in ASEAN, the need for its own policies, and policy recommendations.

## **E-commerce and International Trade The Case for Indonesia and Malaysia**

ERIA Discussion Paper 2023 No. 494

By Seema Narayan

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This study evaluates how e-commerce is reshaping international trade in goods for two Association of Southeast Asian Nations (ASEAN) Member States. E-commerce features in the analysis in two forms: (i) as a global trend in the e-commerce transition, measured as the total e-commerce sales as a percentage of total retail sales, and (ii) as the e-commerce ranking of the exporting and importing nations. We examine the relationship between the e-commerce and exports of Indonesia and Malaysia to their 200 or more trading partners, respectively, over 2014–2020. Our results suggest that the global transition towards e-commerce benefits the exports of both nations, although its mediating role for the bilateral supply chain–exports relationship is conspicuous for Indonesia only. Moreover, an increase in the e-commerce ranking of the two nations impacts their exports positively, but a higher e-commerce ranking of the trading partner countries adversely affects exports in Indonesia and Malaysia. We also find that interactions between e-commerce and supply chains can boost exports. However, in many cases, this occurs if e-commerce growth is falling. Our results imply that e-commerce enablers remain underdeveloped, and that cross-border e-commerce activities depend on existing trade enablers such as supply chain drivers. Therefore, the growth of e-commerce may have been partially responsible for the supply chain disruptions in Indonesia and Malaysia. We show that the results vary between Indonesia and Malaysia and by trading partner. We scrutinise our results using an array of robustness tests and provide policy implications for the two ASEAN Member States.

# An Inclusive Digital Economy in the ASEAN Region

ERIA Discussion Paper 2023 No. 505

By Mima Sefrina

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The rapid development of the digital economy in ASEAN offers broad economic and societal opportunities but also accentuates disparities between urban and rural areas, large enterprises and SMEs, and various segments of the population. While inclusiveness has been a priority on ASEAN's agenda, there is room for improvement. The concept of an inclusive digital economy in ASEAN should extend beyond broadband connectivity and necessitates a precise definition through quantifiable measures. Identifying the key elements of exclusion and inclusion as a strategic approach to effectively address inclusiveness issues is essential to understand the barriers hindering the achievement of an inclusive digital economy.

There is also a need to identify specific populations, understand their characteristics, and address their needs for inclusion in the digital economy. A robust, region-specific data system that is accessible to the public is critical. In ASEAN, an inclusive digital economy underscores the need to address digital skills, gender inequality, digital finance, and the empowerment of MSMEs as key economic drivers in ASEAN.



# Regulation and Governance



## Malaysia's Blue Economy: Position, Initiatives, and Challenges

### Policy Brief 2023 No. 4

By Abdul Hafiz Mohd Azam, Muhammad Rias K.V. Zainuddin, Tamat Sarmidi

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Malaysia leverages the economic activities in and around its oceans, seas, and coastal areas, as its maritime space is double the country's land area. The marine-based or blue economy contributes about 23% of Malaysia's GDP. Realising the importance of the blue economy led Malaysian policymakers to incorporate the concept of the blue economy in the Twelfth Malaysia Plan, which was developed in consultation with relevant ministries and organisations. Although the blue economy has been identified as a key area of growth for Malaysia, its development faces numerous challenges such as the absence of a comprehensive national ocean policy and marine spatial plan, overlapping jurisdiction amongst government agencies, and shortage of labour. Thus, a systematic approach is necessary to analyse the gaps in the '8i-ecosystem' to ensure the effective development and management of Malaysia's blue economy. To ensure that the initiatives for the blue economy in Malaysia are on track and delivering the intended outcomes, appropriate monitoring and evaluation approaches and mechanisms must be in place.

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## Developing the Blue Economy in Indonesia

### Policy Brief 2023 No. 5

By Canyon Keanu Can, Teguh Dartanto

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During Indonesia's chairmanship of ASEAN in 2023, it has highlighted the blue economy as a key sector for the region's sustainable future. A greener and bluer economy requires both environmental and societal balance. In prioritising the sector, Indonesia recognises both the steep challenges and the abundant potential associated with the blue economy, alongside the need for international and inter-sectoral cooperation to fully leverage the sector's capacity for a more inclusive and equitable future. This brief explores Indonesia's existing progress in harnessing its blue economy, what challenges lie ahead, and what strategic initiatives Indonesia must undertake to pave a pathway towards a blue economic transformation.

# The Blue Economy in Brunei Darussalam

Policy Brief 2023 No. 9

By Asnawi Kamis

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Brunei Darussalam needs new drivers to diversify the economy due to its one-dimensional nature. At the same time, the country is facing other challenges such as environmental degradation and climate change, which have been highlighted in other strategic documents. Hence, this policy brief proposes strategies for developing the blue economy in Brunei. The strategies are categorised into three key areas: industrial development, sustainability, and food security.

These areas, along with their respective indicators, are encapsulated in the blue economy framework, consisting of goals, key areas, key indicators, strategies, and custodians. The framework should be documented in a master plan, administered by a council. Two sets of cross-cutting and area-specific strategies are recommended: (i) a combination of structural reforms, policies, and legislation; and (ii) programmes and projects. The implementers comprise government ministries and departments, statutory boards, higher learning institutions, and research institutions as well as government-linked companies.

# An Overview of the Blue Economy of the Philippines – A Brief Assessment and Recommendations

Policy Brief 2023 No. 12

By Donah Baracol Pinhão

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This overview provides a brief assessment of the blue economy of the Philippines, listing the main challenges and risks facing all stakeholders in the development, strengthening, and growth of the sectors it comprises. Potential enablers for the blue economy are identified, and monitoring and evaluation mechanisms that may be useful both at the national and the ASEAN levels are presented. The formulation of a national strategy and a roadmap for the blue economy is a crucial initial step for the government. Sustainability, resiliency, and inclusivity must be identified as pillars of the blue economy and integrated into all relevant planning frameworks.



# Good Regulatory Practice in Malaysia

## Policy Brief 2023 No. 15

By Muhammad Faliq Abd Razak, Sufian Jusoh, Tamat Sarmidi, Intan Murnira Ramli

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International indicators suggest that Malaysia has attained a level of parity with high-income OECD nations, primarily attributable to the establishment and implementation of Regulatory Policy, particularly in meeting GRP requirements and regulations. The significance of Malaysia's regulatory reforms and GRP is underscored by various factors, with the World Bank Group in 2019 highlighting crucial aspects related to regulatory governance for development and growth in the country. Malaysia's GRP experience stands out, characterised by several significant elements. The engagement of the business sector was facilitated through a high-level task force named PEMUDAH, achieving notable success evident in both the process and outcomes.

To promote the adoption of GRP, Malaysia established a comprehensive institutional ecosystem, enabling the meticulous implementation of all facets of the reforms. Over the past few decades, GRP commitments have been seamlessly integrated into both Malaysia's medium-term national development plans and its long-term development vision, ensuring high-level support and continuity for this agenda. Lastly, Malaysia has shifted its regulatory reform focus from a deregulatory strategy to one that complements it by placing emphasis on regulatory quality.



# Financial Services Trade Liberalisation in Indonesia: Policy Patterns and Economic Linkages

ERIA Research Project Report 2023 No. 21

Edited by Fauziah Zen, Lili Yan Ing, Matteo Fiorini

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Indonesia's ongoing financial sector reforms align with regional commitments, particularly the ASEAN Framework Agreement on Services (AFAS), designed to enhance efficiency and competitiveness within the services sector. This report employs the OECD Services Trade Restrictiveness Index (STRI) to evaluate Indonesia's financial sector policies in comparison with other sectors and emerging economies.

The study reveals that narrowing the gap to the best-performing country by half in each sector would result in an average reduction of Indonesia's STRI by 0.18 across all sectors. This, in turn, would alleviate over one-third of the current regulatory restrictiveness on services trade. The anticipated decline in service trade costs is estimated at approximately 27% on average across all sectors.

Beyond the overall reduction in trade costs, the study identifies varying levels of impact from the financial sector on the performance of different industries. These findings shed light on the interconnectedness between financial services liberalization and broader economic dynamics within Indonesia.

Indonesia's commitment to financial sector reforms, in line with regional agreements, holds the potential to significantly enhance the efficiency and competitiveness of its services sector. The observed reductions in STRI and service trade costs underscore the positive outcomes of such reforms, with implications for broader economic linkages and industry performance.

# Integrative Report on Implementation of the Circular Economy in ASEAN

ERIA Research Project Report 2023 No. 27

Edited by Intan Murnira Ramli, Michelle Chandra Kasih

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The rapid ascent of industrialisation and economic success in ASEAN has often been built upon a take-make-waste system, at the expense of environmental and human health. To mitigate further impacts, the circular economy emerges as an opportunity to conserve the environment, enhance well-being, and sustain economic growth.

In ASEAN, immediate policies related to the circular economy have been formulated and applied in sectors such as agriculture, energy, and transportation. Most initiatives concentrate on eliminating food waste, promoting electric vehicles, and utilising renewable energy. However, execution faces challenges, including a lack of public participation, fragmentation between responsible ministries, limited access to technology and infrastructure, and societal perceptions regarding waste.

This report advocates for a whole-of-nation approach, emphasising policy coherence amongst institutions, educational programmes, public–private financing for green infrastructure, subsidies, or incentives directed towards green transformation, all complemented with effective monitoring mechanisms. These strategies aim to accelerate ASEAN's transition towards a circular economy.

# Divergence in Non-Tariff Measures and the Quality of Traded Products

ERIA Discussion Paper No. 474

By Doan Thi Thanh Ha, Kunhyui Kim, Mahdi Ghodsi

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Non-tariff measures (NTMs) constitute a grey area where trade policy meets public policy goals. NTMs comprise a diverse set of regulatory policy measures, including testing and certification, rather than traditional international trade policy measures such as tariffs or tariff-rate quotas. Regulatory NTMs protect plants, animals, humans, and consumers from imported harmful products containing diseases; regulate the use of hazardous substances in production; ensure conformity with common standards; and protect the environment. Trade literature has focused on the impact of NTMs on trade flows, whereas few studies address the potential welfare-improving effects of these measures. This paper fills this gap by examining the relationship between NTM applications and the quality of traded products. Two questions are addressed. First, do more or additional burdens of NTMs in the foreign market incur a higher quality of exported products? Second, is the quality impact of NTMs in different sectors different between food and other manufacturing goods? We adopt a recently developed indicator to capture the additional requirements for exporters stemming from importers' imposition of NTMs, and a quality estimator that controls for price. Our empirical results indicate that, overall, divergence in sanitary and phytosanitary (SPS) measures between the two trading partners reduces the quality of traded goods. Furthermore, while the divergence in SPS measures reduces the quality of traded goods in the manufacturing sector, the divergence in technical barriers to trade shows no statistically significant impact on the quality of traded goods between the two trading partners. The results imply that additional costs from technical barriers to trade are negligible compared with those from SPS measures in the manufacturing sector.



## **Structural Changes and the Impact of FDI on Singapore's Manufacturing Activities**

ERIA Discussion Paper No. 478

By Shandre Mugan Thangavelu

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This paper examines the investment and foreign direct investment (FDI) policy of Singapore's economy in terms of the structural transformation of the economy from 1998 to 2018. The study also examines the impact of FDI on the productivity of the Singapore manufacturing industries in a panel framework from 2017 to 2019. The results indicate that FDI activities have a positive impact on labour productivity. The export activities of multinational businesses have a positive impact on labour productivity. We also observe agglomeration effects from FDI activities (average FDI activities over 3 years) in Singapore's manufacturing industries. However, we observe a negative impact of outsourcing labour productivity. The study also derives policy implications for forward-looking policies in terms of the position of Singapore in the global production value chain.

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## **Revisiting the Impacts of COVID-19 Government Policies and Trade Measures on Trade Flows: A Focus on RCEP Nations**

ERIA Discussion Paper No. 489

By Nathapornpan Piyaareekul Utama

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This study investigates the impacts of COVID-19 government policies and trade measures on trade flows and trade resilience in Regional Comprehensive Economic Partnership (RCEP) nations from the first quarter of 2017 to the fourth quarter of 2022. Using panel data analysis and penalised Poisson Pseudo-Maximum Likelihood regression, the results show that COVID-19 containment and health policies implemented by RCEP and partner countries as well as income support and debt relief measures taken by RCEP nations have favourable impacts on trade flows and trade resilience for RCEP countries. However, COVID-19 stringency

measures implemented by RCEP and partner countries, as well as partners' income support and debt relief measures, had detrimental impacts on the trade flows and trade resilience of RCEP countries. RCEP trade flows were also influenced by liberalised and restricted trade measures. The implications of these findings for improving trade performance amongst RCEP nations post-COVID-19 are highlighted.

## The Impact of Regulatory Divergence in NTM on the Cross-Border Investment of Multinationals

ERIA Discussion Paper No. 493

By Andrzej Cieslik, Mahdi Ghodsi

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In this paper, we study the effects of international regulatory convergence in non-tariff measures on the cross-border investment of multinational firms. We verify two main research hypotheses derived from the modified knowledge-capital model of the multinational enterprise. The first hypothesis postulates that when regulatory divergence with numerous regulatory measures in the destination emerges, trade cost also increases – stimulating horizontal multinational activity. The second hypothesis states that regulatory convergence could reduce the trade costs between the two trading partners, facilitating vertical multinational activity. To verify these hypotheses, we use firm-level data from the Orbis database for 2004–2020 and the Poisson pseudo-maximum likelihood (PPML) estimation technique.

Our estimation results for the full sample of firms show that greater regulatory divergence is negatively associated with the extent of multinational activity. In addition, the convergence of technical barriers to trade seems more important than the convergence of sanitary and phytosanitary measures. Moreover, more productive firms can overcome problems associated with both technical barriers to trade and sanitary and phytosanitary distances. Finally, we find significant heterogeneity across sectors that varies according to technology intensity.

## Exploring Pathways for Deeper Regional Cooperation on NTMs in ASEAN and East Asia

ERIA Discussion Paper No. 497

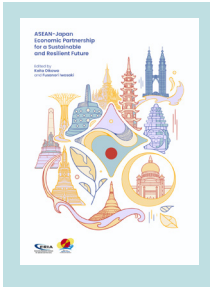
Edited by Kaoru Nabeshima, Ayako Obashi, Kunhyui Kim

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In this paper, we develop and examine an indicator for regulatory harmonisation amongst member countries in a given regional agreement based on the regulatory differences between countries using a non-tariff measure (NTM) data set. This study defines the 'optimal' set of regulations as the set of regulations where the adoption cost (i.e. differences in regulation between a base country and a partner country) is the lowest, considering all the possible trading pairs in an agreement. This provides guidance to policymakers regarding which country's regulations could serve as the basis for discussion on regulatory harmonisation. To do so, we examine regional integration efforts in Asia – the Association of Southeast Asian Nations (ASEAN) Economic Community (AEC), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the Regional Comprehensive Economic Partnership (RCEP), and China–Japan–Republic of Korea Free Trade Agreement negotiations (CJK).

# Sustainable Economy and Environment





## ASEAN-Japan Economic Partnership for a Sustainable and Resilient Future

Edited by Keita Oikawa, Fusanori Iwasaki

The ASEAN–Japan relationship began in 1973 and gained significant momentum in the late 1980s with a surge in Japanese foreign direct investment (FDI) in ASEAN. Throughout the 1990s, Japanese multinationals further expanded their global production processes, capitalising on advancements in information and communication technology. This development transformed ASEAN into a key production hub, fostering substantial economic growth. As a result, ASEAN’s GDP currently stands at approximately \$3.62 trillion. Despite the challenges presented by the pandemic, it has served as a catalyst for the emergence and expansion of new digital services, such as e-commerce and cashless transactions. Notably, ASEAN has demonstrated its digital capabilities, with over 30 unicorn companies recorded in 2021 and a fast-growing number of youth-led start-ups.

ASEAN’s remarkable economic growth, driven in part by its tech-savvy young generation, signifies the region’s immense potential for future development. However, there are existing challenges that need to be addressed, including disparities in physical, human, and social capital development across countries, urban–rural divides, and disparities amongst industries.

Japan, despite having the world’s oldest population, possesses advanced technologies and substantial human and social capital. These assets position Japan as a crucial partner in harnessing ASEAN’s potential. It is evident that ASEAN and Japan possess unique advantages and complement each other. Their economic cooperation, therefore, should focus on deepening economic integration and co-creating innovative solutions for the mutual benefit of both ASEAN and Japan.

Recognising this collaborative synergy, ASEAN and Japan should regard each other as indispensable partners in their respective paths of economic development. With this understanding in mind, the report puts forth recommendations organised into four key themes: 'Promoting Trade and Investment', 'Encouraging a Digital and Innovative Society', 'Aiming for a Sustainable Future', and 'Building a Professional Workforce for the Future.' These recommendations are proposed within the context of the ASEAN–Japan Economic Partnership and aim to foster a sustainable and resilient future.

## Development of the Blue Economy in Viet Nam

ERIA Policy Brief 2023 No. 3

By Vo Tri Thanh

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Viet Nam is exploring various models to promote long-term economic growth and sustainable development, including the blue economy. Viet Nam's policy documents have no formal definition of the marine economy or the newer concept of the blue economy. However, the policy documents have increasingly captured the essence of the blue economy, especially related to sustainable development. While lacking frequent updates and sufficient scope, the available statistics show the importance of the marine economy in the country. Viet Nam has various advantages for blue economy development, including high levels of sea traffic, a large sea area, a long coastline, and abundant marine resources. New opportunities for blue economy development can arise from consumers' attention to sustainable development, improvement of the related legal framework, and cooperation with partners and foreign investors. However, Viet Nam needs to improve the awareness of local authorities and people, strengthen institutions for blue economy development, and upgrade the capacity to forecast and warn of natural disasters and climate change at sea, including via international cooperation.

## **Sustainable Blue Economy Development in Cambodia: Status, Challenges, and Priorities**

ERIA Policy Brief 2023 No. 6

By Kongchheng Poch, Sothea Oum

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Cambodia is at the early stage of maximising the full potential of the blue economy, inclusively and sustainably, due to the lack of an integrated policy framework, clear strategies, and concrete actions. It is critical to address the immediate challenges in the decline of the health and well-being of the marine environment and coastal communities (marine fish stock decline, ecosystem degradation, and pollution). Cambodia also needs to incorporate marine spatial planning in its long-term development vision – strengthening institutional arrangements and capacity, human resources, and investment in coastal and marine infrastructure and technologies. An integrated and multisectoral approach to blue economy development, which places environmental sustainability and people at the centre, also needs to be developed. Cambodia should take advantage of the growing interest in the blue economy at the global, regional, and country levels through effective enforcement of existing laws and regulations; tapping sustainable financing, including blue financing; and participation in the global framework and the Association of Southeast Asian Nations (ASEAN) Blue Economy Cooperation Framework.

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## **Developing a National Blue Economy Framework for Lao PDR**

ERIA Policy Brief 2023 No. 8

By Aloun Phonvisay

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This policy brief discusses the development of a national blue economy framework for the Lao People's Democratic Republic (Lao PDR) to capitalise on the country's rich water and forest resources in a sustainable manner. The framework would promote sustainable development of the blue economy, identify priority areas for investment, enhance stakeholder capacity, and promote the Lao PDR blue economy. The priority sectors identified for investment include fisheries, forest carbon, inland marine connectivity, and hydropower development.

# Building and Enhancing Sustainable Agriculture and Food Systems in ASEAN: A Preliminary Scoping Study

ERIA Policy Brief 2023 No. 10

By Masanori Kozono, Kentaro Yamada, Siti Mustaqimatud Diyanah

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'ASEAN Regional Guidelines for Sustainable Agriculture in ASEAN' were adopted at the 44th Meeting of the ASEAN Ministers on Agriculture and Forestry on 26 October 2022. The successful implementation of these guidelines necessitates the development of a practical action plan. To assist ASEAN in implementing these guidelines and provide valuable insights for the action plan's development, the Economic Research Institute for ASEAN and East Asia conducted a preliminary scoping study. This study aimed to identify key technology and policy areas, assess the current status of sustainable agriculture, and recommend initiatives for achieving sustainable and circular agriculture.

The study findings highlight the prevalence of specific initiatives, significant disparities in initiatives between Cambodia, Lao People's Democratic Republic, Myanmar, and Viet Nam (CLMV) and non-CLMV countries, and prioritised strategies amongst the 28 key strategies outlined in the Guidelines. The action plan should outline practical actions aligned with the priority strategies, complete with achievable targets and timelines.





## Blue Economy in Myanmar

ERIA Policy Brief 2023 No. 14

By Zaw Oo, Ngu Wah Win

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Myanmar's commitment to the Blue Economy is driven by the Sustainable Development Goals, and it has developed a long-term plan to guide its efforts in reaching these goals. Myanmar's vision of a Blue Economy involves various sectors, such as fisheries, tourism, and energy. However, the sustainable development of these sectors is facing many challenges, such as conflicts in coastal townships and the departure of foreign businesses. Myanmar must actively seek international cooperation with neighbouring countries and organisations such as the Association of Southeast Asian Nations (ASEAN) to form a stronger framework for sustainable use of ocean resources; invest in research, data collection, and capacity building; and strengthen the governance of Marine Protected Areas.

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## Blue Economy Initiatives in South-East Asia: Challenges and Opportunities

ERIA Research Project Report 2023 No. 17

Edited by Intan Murnira Ramli, Tomy Waskitho

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The Blue Economy has emerged as a compelling strategy for safeguarding inland water and ocean resources while fostering economic growth. In ASEAN, the Blue Economy's contribution to GDP varies widely, ranging from 1% to as high as 30%. Recognising the Blue Economy's potential as an alternative growth engine while preserving sustainability, ASEAN leaders endorsed the ASEAN Blue Economy Framework at the 2023 ASEAN Summit in Jakarta.

This report sheds light on the immense and untapped marine potential of the Southeast Asian region. Additionally, it highlights the distinct approaches taken by individual ASEAN Member States in addressing the challenges and opportunities presented by the Blue Economy.

Despite these differences, there is a shared recognition amongst ASEAN Member States of the paramount importance of strong collaboration, particularly in tackling current and emerging challenges such as climate change, habitat destruction, inadequate regulatory frameworks and awareness, poor resource management, and gaps in data and scientific knowledge.

## Circular Value Chains of Electrical and Electronic Equipment in ASEAN

ERIA Research Project Report 2023 No. 18

Edited by Keita Oikawa, Fusanori Iwasaki

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This study aims to address urgent issues surrounding electrical and electronic equipment (EEE) waste and present policy recommendations for collaboration between ASEAN Member States (AMS) and Japan in the ASEAN–Japan Circular Economy Initiative. A significant increase in e-waste generation is predicted in Asia, with ASEAN facing specific challenges in treating uncontrolled used EEE and locally generated e-waste. The informal sector, which plays a significant role in waste management in ASEAN, lacks proper technologies and knowledge for environmentally sound treatment, leading to environmental pollution and health risks. Japan’s experience in e-waste management can serve as a valuable reference for AMS. The global momentum towards a circular economy reinforces the need for efficient resource use and sustainable systems. Both ASEAN and Japan are pursuing circular economy policies, and the ASEAN–Japan Circular Economy Initiative is expected to enhance economic relations. To address these issues, three key recommendations are proposed. First, Japan can share its experiences in establishing and enforcing legal systems with AMS, focussing on specific challenges and solutions. Second, business collaboration between AMS and Japan should be fostered through technical cooperation, joint ventures, and international resource circulation. Lastly, closer alignment with international rules and standards for reuse and remanufacturing and advancing trade openness is crucial to facilitate trade and to ensure quality and safety assurance.

## Use Case Concretisation: Visualisation of Carbon Footprint

ERIA Research Project Report 2023 No. 23

Edited by Keita Oikawa, Fumitaka Machida, Mahirah Mahusin

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This report marks the progression of 'The Vision for the Digitalisation of Supply Chains in ASEAN and Japan.' The initial vision outlined four priority use cases crucial for implementing the vision: (i) visualisation of the supply chain structure, (ii) risk prediction, (iii) visualisation of carbon footprints, and (iv) design and research and development (R&D) data sharing. Building on the insights from our discussion group, our focus is now on concretising one specific use case in preparation for implementation. The chosen starting point is the visualisation of carbon footprints, given its significance in global and regional markets and the keen interest it garnered within the discussion group. Despite various ASEAN governments announcing net-zero targets, challenges persist due to inaccuracies in carbon emissions data and a lack of guidelines for greenhouse gas (GHG) calculations. This use case not only addresses the specific challenges faced by the automotive industry but also acts as a foundational element for other use cases. It identifies stakeholders across the industry's value chain, establishing necessary data sharing standards and structures for broader initiatives.

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## Effectiveness of Self-Regulating Sustainability Standards for the Palm Oil Industry

ERIA Discussion Paper 2023 No. 476

By Etsuyo Michida

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National sustainability certification schemes for the palm oil sector such as Indonesian Sustainable Palm Oil (ISPO), and Malaysia Sustainable Palm Oil (MSPO) have emerged to address negative environmental externalities and increase productivity of the sector. However, their reach does not extend to international markets, with differing aspirations and compliance mechanisms compared to the globally recognised private certification scheme. Benchmarking and harmonisation across the schemes could have multiple benefits. First, it

decreases fragmentation of standards and allows procurement of certified palm oil at lower costs. Second, a harmonised regional scheme rather than multiple national schemes makes communication on the improvement of sustainability standards with global users easier, while involvement of users in their revision is expected to lead to their global recognition. Third, having a harmonised ASEAN standard can help other member countries in the region or countries from other regions to benchmark and adopt it as a proxy global standard, which prevents further fragmentation and proliferation of local standards. Making sustainable palm oil certifications acceptable for international markets is expected to pave the way for similar programmes for other agricultural products. Lastly, as the proliferation of standards leads to confusion amongst consumers, a harmonised standard improves understanding and clarifies the expected impact on the palm oil sector.

## Industry Agglomeration, Urban Amenities, and Regional Development in India

ERIA Discussion Paper 2023 No. 486

By Subash Sasidharan, Shandre Thangavelu

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Industrial agglomeration is an important component to create efficiency and externalities for industrial growth and competitiveness for the Indian economy. In this paper, we examine the spatial location of Indian firms and industry agglomeration at district and township level for the Indian economy. Particularly, we examine the impact of urban amenities in driving the industrial agglomeration in the Indian economy using firm-level data. We carefully control for township-level urban amenities, as well as firm level characteristics in affecting the industry agglomeration. As opposed to previous state- and district-level studies, we examine the impact of urban amenities at a more disaggregated township level for 2011. The study also examines the impact of urban amenities on manufacturing, as well as the services sector. The empirical analysis findings indicate a positive correlation between town-level disparities in industry agglomeration and various amenities, including education, healthcare, energy, transportation, finance, and cultural resources. These results remain consistent when considering alternative measures of agglomeration and conducting sub-sample analyses.

## **Agricultural Production as a Coping Strategy during the Covid-19 Pandemic? Evidence from Rural Viet Nam**

ERIA Discussion Paper 2023 No. 495

By Hai-Anh H. Dang, Cuong Viet Nguyen

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We examine the Covid-19 pandemic-induced negative effects on household welfare in rural Viet Nam. Analysing recent Viet Nam Household Living Standard Surveys spanning 2016–2021, we find robust evidence that lockdown measures resulted in a 3.9% reduction in per capita income and a 2.6 percentage-point increase in the headcount poverty rate of rural households. It also had severe effects on rural households' wages and self-employed non-farm income, but rural households appeared to have relied on farm income to cope with the lockdowns. Each additional month under lockdown reduced wage income and non-farm income by 2.8% and 6.3% respectively but increased crop income by 9.5%, livestock income by 7.1%, and other farm income by 12.2%.

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## **Quantitative Analysis of Optimal Investment Scale and Timing for Flood Control Measures by Multi-Regional Economic Growth Model: Case Studies in Viet Nam**

ERIA Discussion Paper 2023 No. 496

By Hiroaki Ishiwata, Masashi Sakamoto, Makoto Ikeda, Venkatachalam Anbumozhi

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This study aims to develop and utilise a multi-regional economic growth model that can take into account flood damage and investment in disaster risk reduction, and, through case studies in Viet Nam, quantitatively analyse the long-term effects of investment in disaster risk reduction on the national and local economy, as well as the optimal scale and timing of investments in flood protection, to gain a better overview of these factors. The results indicate that additional investment in disaster risk reduction could stimulate economic growth, and that the optimal range of the disaster risk reduction budget rate was around 0.3% to 0.5% of GDP, assuming a constant budget rate throughout the total 25-year calculation period. In the

case of a variable disaster risk reduction budget rate, we observed that a variable budget rate that gradually reduces the disaster risk reduction budget rate from a higher level than the current rate could further promote economic growth than if the budget rate were fixed. In both cases, we verified that with excessive investment in disaster risk reduction, the high tax burden had the risk of reducing investment in production capital and lead to stagnating economic growth. By region, the long-term effects of investment in disaster risk reduction were most seen in the Central region, where the rate of flood damage is the highest.



# Trade and Investment





## Membangun UMKM Pariwisata dan Ekonomi Kreatif di Indonesia Timur

Edited by Anika Widiana, Grace Hadiwidjaja,  
Militcyano Sapulette, Elitua Simarmata

The book dives into issues surrounding the development of the creative industry and tourism by micro, small, and medium enterprises (MSMEs) in five East Indonesian provinces. Roles that can be taken up by various stakeholders, especially by the local and central government, concerning the creative industry and tourism development involving MSMEs are identified and discussed in this Book. MSMEs' roles in the creative industry and tourism development are identified as potential sources of growth that can alleviate the region from the persisting poverty and catch up with other regions in Indonesia. The book also touches on how the COVID-19 Pandemic has shifted consumer behavior and how MSMEs in the tourism and creative industry sector can strategize respectively.

Each chapter focuses on specific issues in an East Indonesian province. The chapter on West Nusa Tenggara focuses on the ideal organization of local government bodies and policy instruments to create and maintain a competitive creative industry for MSMEs. The dynamics of the traditional Sumba woven fabric industry are presented in the chapter on East Nusa Tenggara. The chapter on North Sulawesi presents extensive SWOT analyses of MSMEs' roles in the creative industry during and post the COVID-19 Pandemic. Two chapters on Maluku analyze the roles of MSMEs in the fishery and tourism sectors respectively. Lastly, the chapter on Papua describes and analyzes key areas in need of support from governmental and non-governmental bodies for the development of tourism MSMEs in Raja Ampat.



The book is written by selected authors from East Indonesia and offers unique lenses of analysis from their first-hand perspective of the development issues surrounding MSMEs in the region. Areas needing local and central government's attention are highlighted, which include economy-wide structural issues such as access to natural resources, air transport, reliable utility provision, education, access to affordable quality healthcare, and the development of renewable energy in the region.

## **Financing Infrastructure for Climate-Change Adaptation in Developing East Asia**

ERIA Research Project Report 2023 No. 5

Edited by Fauziah Zen, Usha Iyer-Raniga

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Climate change has resulted in a surge in natural disasters, and the Asia-Pacific region alone contributes to over half of the global carbon dioxide emissions. Addressing climate change through adaptation measures is crucial for effectively dealing with these natural calamities and ensuring environmental resilience. It also demands the development of infrastructure that can withstand such disasters and adapt to changing environmental conditions. However, financing climate-adaptive infrastructure poses significant challenges, as it requires substantial resources, research, and transitional processes. These challenges are particularly pronounced in emerging economies with limited government funding. To address this financing gap, innovative approaches such as public-private partnerships and mixed finance schemes have been introduced. These schemes involve pooling funds from international organisations, development agencies, the corporate sector, charitable foundations, and public sources, enabling risk diversification and indirect investment. By implementing climate-change adaptation strategies throughout the infrastructure lifecycle, including planning, design, implementation, management, and utilisation, we can not only reduce emissions but also safeguard the environment. This report offers an analytical overview of the key characteristics of infrastructure funding in selected East Asian economies, focusing on the context of climate change adaptation. It delves into the various financing mechanisms and strategies employed to support climate-adaptive infrastructure development.

# Investment Facilitation and Promotion in Cambodia: Impact of Provincial-level Characteristics on Multinational Activities

ERIA Discussion Paper 2023 No. 480

by Shandre Mugan Thangavelu, Leng Soklong, Vutha Hing, Ratha Kong

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This paper examines the foreign direct investment policy of Cambodia in terms of investment promotion and facilitation. The study examines the key factors affecting the location of foreign firms (with more than 10% ownership) in Cambodia accounting for key provincial-level (18 provinces) characteristics, such as infrastructure (roads), population density (young population), special economic zones (SEZs), the number of establishments, poverty rate, rainfall, water supply, electricity supply, sharing of an international border, sharing a coastal area, and consumption per capita. The paper uses administrative data from the Council for Development of Cambodia, which manages foreign direct investment and the special economic zones in Cambodia.

The study consists of nearly 500 foreign firms that have been approved to invest in Cambodia from 2017 to 2020. The results indicate a positive impact of road infrastructure (national and provincial roads) on foreign investment activities as it improves the movement of people and goods, reduces transaction costs, increases market access, and increases the service linkages within the domestic economy. At the provincial level, we observe that electricity supply, rainfall (water supply), land area, and a young working population have a positive impact on the investment decisions of foreign investors in the provinces of Cambodia. We also observe a negative impact of SEZs on foreign investment in Cambodia.

The results indicate an urgent need for structural transformation of the Cambodian economy in terms of investment in soft and hard infrastructure and the development of the critical skills and human capital of the labour force. It is important to improve and upgrade the SEZs with key technologies and innovation to be more competitive in attracting foreign investment activities, which will be critical for increasing the competitiveness of Cambodian industries in global value chain activities.

## The COVID-19 Pandemic and World Machinery Trade Network

ERIA Discussion Paper 2023 No. 482

by Kozo Kiyota

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In light of the importance of the machinery trade in global trade, this study examines whether the patterns of machinery exports changed significantly after the COVID-19 pandemic. Frameworks of network analysis and structural break analysis are applied to monthly level bilateral export data from January 2016 to March 2022. The main findings are threefold. First, positive structural change is found in exports in major machinery-exporting countries. Second, negative structural change in centrality is found in Japan and some ASEAN Member States (AMS), which implies a decline in the relative importance of these countries in the global machinery network. Third, the decline in Japanese centrality was not caused by the decline in export values or number of destination countries. Rather, it is attributable to the decline in the centrality of Japan's export destination countries such as AMS. Noting that Japan has a relatively strong trade relationship with AMS, these results together suggest that the negative shock of the pandemic spread throughout the supply chain, which led to the decline in the relative importance of some countries – such as Japan – in the global machinery trade network.

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## The Role of Export Incentives and Bank Credit on the Export Survival of Firms in India During COVID-19

ERIA Discussion Paper 2023 No. 484

by Radeef Chundakkadan, Subash Sasidharan, Ketan Reddy

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The aim of this study is threefold. First, we analyse the relationship between export incentives on firm survival during the coronavirus disease (COVID-19) crisis; second, we explore the nexus between bank dependency and survival in the export market; and finally, we test the complementarity and substitutability effect of export incentives and bank dependency on export market survival. We use firm-level information on Indian firms from 2016 to 2022, covering 4 years of the pre-pandemic period and 2 years of the post-pandemic period. We find

that both export incentives and bank dependency improve the probability of export market survival in the post-pandemic period. These results are applicable to both the manufacturing and services sector, stand-alone firms, and business group affiliates. Our results remain robust while employing alternative proxies for the primary variable of interest and different methodologies.

## **Does Financial or Trade Integration Cause Instability? Evidence from Emerging and ASEAN Economies**

ERIA Discussion Paper 2023 No. 490

by Rakesh Padha, K.P. Prabheesh

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This study empirically examines the nexus amongst financial integration, trade integration, and instability in various emerging and Association of Southeast Asian Nations (ASEAN) economies. Using newly constructed financial integration indices and the Toda-Yamamoto causality test, it is found that (i) tremendous changes occurred in the levels of financial and trade integration in these economies during the COVID-19 pandemic; (ii) in most cases, financial integration caused exchange rate volatility, inflation volatility, and interest rate volatility, while trade integration caused credit volatility, exchange rate volatility, and growth volatility; and (iii) not all types of integration caused instability, and portfolio integration caused exchange rate instability in most cases.

# Tourism Exports, Digitalisation, and Employment during the COVID-19 Pandemic: The Case of Indonesia

ERIA Discussion Paper 2023 No. 491

by Mini P. Thomas, Archana Srivastava, Keerti Mallela

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This study aims to examine the relationship amongst tourism exports, digitalisation, and employment in tourism and allied sectors of Indonesia; and to throw light on how low-, medium-, and high-skilled employment have been impacted during the coronavirus disease (COVID-19) pandemic. We include both transport service exports and travel service exports within the ambit of tourism exports. Digitalisation is defined in terms of digitally deliverable services. The study classifies employment at varying skill levels on the basis of educational qualifications, and occupation-based skill classification is used as a robustness check. The COVID-19 pandemic is captured with the help of a time dummy variable and also using the Stringency Index.

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The study estimates the bound testing approach to the autoregressive distributed lag (ARDL) model using quarterly time series data, and the autoregressive moving average with exogenous variable (ARMAX) model using monthly time series data, to understand the nature of the long-run relationship and short-run dynamics amongst the variables of interest. The study establishes the presence of cointegration amongst employment, tourism exports, digitalisation, and other control variables in all four cases – total employment, and low-, medium-, and high-skilled employment. We find tourism exports to have a positive and significant impact on employment, except high-skilled employment. Digitalisation of tourism exports is found to have a significant but negative impact on the total, low-skilled and medium-skilled employment. The COVID-19 pandemic is also found to have a negative and significant impact on total employment in Indonesia, with low-skilled employment being the worst affected.

## Effectiveness of Monetary and Fiscal Policy in Mitigating Pandemic-Induced Macroeconomic Impacts

ERIA Discussion Paper 2023 No. 492

by Bhavesh Garg

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This paper employs a two-economy model, which incorporates New Keynesian features, to examine the impact of a coronavirus disease (COVID-19) induced supply shock on economic recovery in large net oil-importing Asian countries. It examines whether and to what extent monetary and fiscal policies are effective in mitigating such supply shock risks.

Our calibrations and estimations reveal that a COVID-19 induced supply shock negatively impacted both the global and domestic economies alike and delayed their economic recovery. Specifically, shocks to total factor productivity and world output negatively affected domestic macroeconomic variables such as domestic output, inflation rate, interest rate, and government expenditure, amongst others. We show that monetary and fiscal policies efficiently mitigate the adverse effects arising from the supply shock.

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## Economic Transformation and a New Economic Order

ERIA Discussion Paper 2023 No. 498

by Lili Yan Ing, Justin Yifu Lin

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World economic governance was largely dominated by major developed countries in the 20th century. Over the last half-century, we have witnessed a global economic transformation. The shift is evident in the changing global shares amongst developed and developing countries across four key economic metrics: total output, trade in goods, manufacturing value added, and foreign direct investment. What we find is that the substantial transformations are not primarily caused by significant changes in the growth performance of developed countries but rather by the rapid catch-up of a few developing countries. Sustainable economic growth is a continuous process of technological innovation, elevating labour productivity, and industrial

upgrading. Drawing on insights from the growth and structural transformation patterns observed in both developed and developing countries, achieving sustainable economic growth requires (i) optimising comparative advantage and effective infrastructure, (ii) managing gradual transitions economically and politically, and (iii) optimising the use of digital transformation.

## **Dynamics of Trade Characteristics, Competition Networks, and Trade Fragility in ASEAN Economies**

ERIA Discussion Paper 2023 No. 499

by C.T. Vidya

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This paper analyses the trade characteristics, competition networks, and fragility of global trade in goods in the Association of Southeast Asian Nations (ASEAN) economies, particularly in the context of the coronavirus disease (COVID-19). The study covers the 10 ASEAN Member States and 110 trade partners, using the Harmonized System (HS) 6-digit product classification from 2010 to 2021. The findings reveal that ASEAN dominates with trade complementarity. Dense and intense competition networks are found. The electrical and machinery imports from central players are highly sensitive to shocks, with electronics also becoming susceptible to shocks after the pandemic.

The study also shows that liquefied natural gas products and countries such as Singapore, Indonesia, Brunei, and Myanmar experienced increased shocks. The research underscores the importance of policymakers prioritising their understanding of trade linkages and potential spillover effects when formulating policies to mitigate the impact of shocks. The findings have implications for policymakers, highlighting the need for them to take a holistic approach when devising policies and strategies to mitigate the adverse effects of global shocks.

## COVID-19 and Firm Response: Evidence from China

ERIA Discussion Paper 2023 No. 501

by Dongmin Kong, Chen Liu, Mengxu Xiong

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This paper explores the effects of the coronavirus disease (COVID-19) pandemic on firm response. Using a novel COVID-19 sentiment index, our estimation shows that the pandemic significantly reduced the overseas revenue and profits of firms listed on the Chinese A-share market. Moreover, we observe that an increase in loans, and a drop in debt financing cost and trade credit, were prominent during the pandemic.

We contend that reduced cash flows, which damaged firm operations; government support, which provided more financing channels; and increased default risks, which placed barriers on trade credit, are the plausible mechanisms through which the COVID-19 pandemic affects firm performance. Profit contraction was more pronounced for firms with a lower ratio of domestic content in exports and state-owned enterprises, while external financing was easier for firms subject to stringent financial constraints despite their lowered trade credit.

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## Global Sourcing and Firm Inventory During the Pandemic

ERIA Discussion Paper 2023 No. 502

by Hongyong Zhang, Doan Thi Thanh Ha

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Firms hold inventory to manage input shortages and stockout risks. This is particularly true for firms relying on international supply chains and imported inputs. Using a large-scale quarterly government survey of Japanese manufacturing firms (Q1 2015–Q2 2021), we examine firm-level inventory adjustments to supply chain shocks and focus on firms that sourced inputs globally during the pandemic. We find that before the pandemic, relative to firms that purchase inputs only domestically, importing firms tend to have larger inventories (inventories over sales) in materials, work in process (intermediate goods), and finished goods, even after controlling for firm size.



After the pandemic, importers significantly and persistently increased their inventories of intermediate inputs, especially for firms with ex ante higher import intensity and multinational firms that experienced supply chain disruptions in China. These results suggest the possibility of a shift from just-in-time to just-in-case production during the pandemic. We then discuss the role of inventories as a buffer against input shortages and other factors affecting inventory holdings, such as the prefecture-level severity of COVID-19 infections, industry-level input and output prices, and firm-level financial constraints and uncertainties regarding the economic and business outlook.

## **Trade Openness, COVID-19 Shock, Foreign Direct Investment, Inflation, and Output Volatility in Six ASEAN Member States**

ERIA Discussion Paper 2023 No. 503

by Chinmaya Behera, Badri Narayan Rath

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This study examines the effect of trade openness and COVID-19 shock on output volatility. Quarterly data from 2010 to 2022 are used, focussing on six Member States within the Association of Southeast Asian Nations (ASEAN). The analysis, conducted through time-series regression, reveals that trade openness had a notable impact on output volatility in most ASEAN Member States, excluding Thailand and Indonesia.

Furthermore, it found that the pandemic had an impact on the output volatility of Thailand and the Philippines. Macroeconomic variables were also incorporated, such as foreign direct investment (FDI) and inflation. Under the panel framework, it was found that both variables significantly impacted output volatility. These findings indicate that policymakers should prioritise trade openness and inflation control during uncertain events, such as a global pandemic.

# Interconnected Horizons: ASEAN's Journey in the Global Semiconductor Trade Network Amidst the COVID-19 Pandemic

ERIA Discussion Paper 2023 No. 504

by K.P. Prabheesh, C.T. Vidya

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This paper examines the global semiconductor industry trade network and the place of the Association of Southeast Asian Nations (ASEAN) in it. The network analysis parameters (e.g. degree centrality, eigenvector centrality, and closeness) are calculated for two semiconductor product classifications (i.e. Harmonized System (HS) 8541 and HS 8542) as well as key inputs for the manufacturing process and testing, packaging, and distribution.

The study finds that the coronavirus disease (COVID-19) pandemic has a significant adverse effect on the semiconductor trade network. It finds that the central position in the network is determined by Germany, the United States, China, Belgium, India, Italy, Spain, the Netherlands, France, and the United Kingdom. It is also found that Singapore, an ASEAN Member State, occupies the central position in the trade network. Other ASEAN Member States, such as Viet Nam, Malaysia, Thailand, the Philippines, and Indonesia, have been well integrated in the trade network in recent years.

However, countries such as Myanmar, Cambodia, Brunei, and the Lao People's Democratic Republic (Lao PDR) are still in the peripheral area of the network. Nonetheless, over the years, these countries have improved their participation in semiconductor trade. The COVID-19 pandemic has impacted trade in key inputs and manufacturing parts of semiconductor production. It has drastically reduced the trade flows, connectivity, and dependence of many countries in the network.

## The Effect of COVID-19 on Firms' Behaviour: The Case of Japan

ERIA Discussion Paper 2023 No. 506

by Yuting Chen, Bin Ni

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Since the onset of the coronavirus disease (COVID-19) pandemic, social distancing practices and government-mandated lockdowns have become the norm. These have cut off interaction amongst people, firms, and society, triggering an even larger decline in economic activity. In this study, we apply annual Japanese foreign affiliate data to quantify how COVID-19 has affected firms' behaviour in various aspects.

The estimation results show that both the revenue and purchasing behaviour of Japanese foreign affiliates were affected during COVID-19. This negative impact is mainly through the channel of stringent regulations imposed by host countries where affiliates are located. The general result we can derive from these findings is that COVID-19 negatively affects Japanese firms engaged in overseas activities. This leaves us with the question of when external shocks such as COVID-19 stand in the way of firms' overseas activities, and what role the government should play to achieve a balance between safety and economic revival.

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## Have Dynamic Spillovers and the Connectedness of Trade Policy Uncertainty Changed During the COVID-19 Pandemic and Sino-US Trade Frictions?

ERIA Discussion Paper 2023 No. 507

by Chien-Chiang Lee, Farzan Yahya

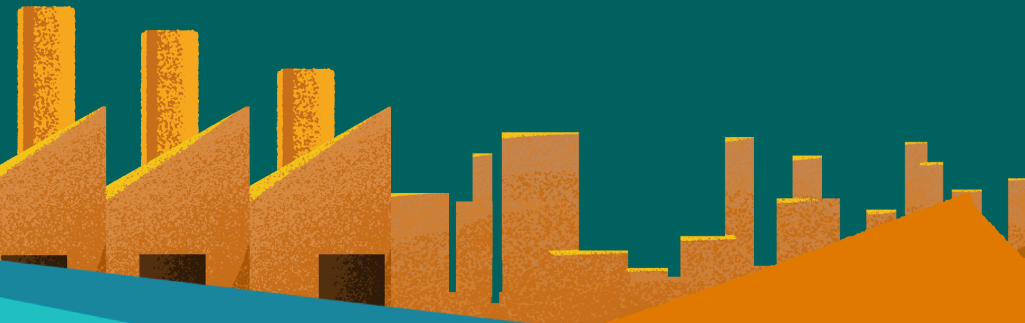
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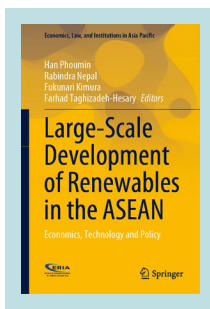
In this paper, we examine the spillover and connectedness between the trade policy uncertainty (TPU) of the United States (US), China, Japan, and the Republic of Korea (henceforth, Korea) under global geopolitical risk (GPR), infectious disease equity market volatility (EMVID), and GPR from North Korea (GPRNK) using a relatively novel time-varying parameter vector autoregression (TVP-VAR) approach. Additionally, method of moments quantile regression is utilised to estimate the asymmetric effect of GPR, GPRNK, and

EMVID on TPU. Our findings suggest that there is a high total and directional spillover amongst underlying variables during Sino–US trade friction that further elevated during the coronavirus disease (COVID-19) pandemic period.

The US is a net receiver of spillover from the TPU of all economies, while the Chinese TPU receives spillover from EMVID. The results further confirm that both the TPU of China (TPUCN) and the TPU of the US (TPUUS) are vulnerable to EMVID, but the effect is stronger for Chinese TPU in the higher quantiles. Although Japanese TPU is less vulnerable to GPR and EMVID, it is significantly exposed to GPRNK. Korean trade shows resiliency and immunity to pandemic-induced volatility and GPRNK.

# Co-publications





## Large-Scale Development of Renewables in the ASEAN

Edited by Han Phoumin, Rabindra Nepal, Fukunari Kimura, Farhad Taghizadeh-Hesary

This book integrates the essential aspects of economics, technology, and policy to propose practical solutions that can foster the extensive development of renewables in the ASEAN region. A distinctive feature of this book lies in its documentation, illustrating that achieving large-scale renewables deployment inevitably demands the convergence of these three distinct yet interconnected forces: economics, technology, and policy.

The economic foundations are informed by microeconomic principles centred on economic efficiency and associated market designs, aimed at delivering short-term economic efficiency. This includes the application of auction designs and cost–benefit analysis. The pivotal role of battery technology and utility-scale batteries as enabling technologies for the large-scale deployment of renewable energy is substantiated through energy modelling techniques.

The book places particular emphasis on identifying key policy barriers to large-scale renewable development and proposes pathways to overcome them. It underscores the significance of carbon pricing in ASEAN countries and advocates for cross-border electricity trade to enhance energy security and achieve clean energy targets. Country-specific case studies and regional case studies are employed to analyse the economic, technological, and policy dimensions of large-scale renewable development, offering valuable policy lessons and recommendations for decarbonising economic regions like the ASEAN.

The selected case studies are meticulously chosen and supported by rigorous data analysis and modelling where appropriate. This comprehensive exploration of energy economics and policy is highly recommended for readers seeking an in-depth and robust overview of recent empirical evidence related to facilitating the large-scale development of renewables, with a specific focus on the ASEAN and Asian economies, including India and China.

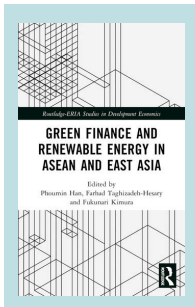
## Green Finance and Renewable Energy in ASEAN and East Asia

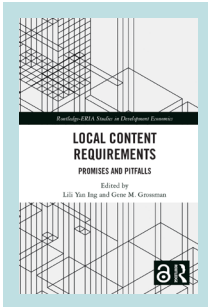
Edited by Han Phoumin, Farhad Taghizadeh-Hesary, Fukunari Kimura

Green Finance and Renewable Energy in ASEAN and East Asia edited by Phoumin, Taghizadeh-Hesary and Kimura provides several empirical policy-oriented studies with new data on ASEAN member states and East Asian economies that deal with innovative and market-based solutions for unlocking private investments in renewable energy projects.

In the wake of COVID-19, the importance of innovative ways and policies for enhancing investments in renewable energy projects to achieve climate-related goals is highlighted. Chapters cover various aspects and means of green finance for renewable energy development, including identifying the financing barriers and solutions for mitigating them, cleantech finance and energy transition, green investment risks, green technology financing, market development, carbon taxation, green bonds, FinTech, and green digital finance. The book collectively provides policy recommendations for designing funding strategies for renewable energy development in ASEAN and East Asia.

A valuable resource to end-users, policymakers, and market players in ASEAN, East Asia, and the rest of the world on access to finance for renewable energy development.





## Local Content Requirements Promises and Pitfalls

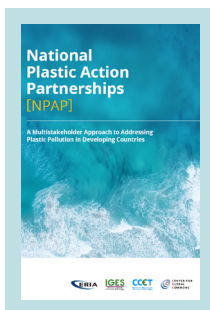
Edited by Lili Yan Ing, Gene Grossman

As anti-globalization and geopolitical tensions continue to rise, the use of Local Content Requirements (LCRs) around the world has become more noticeable than ever before.

The reasons for adopting LCRs range from ensuring domestic supply availability, job creation, increasing value added, to safeguarding national security. Ing and Grossman examine country-specific as well as firm-product level exercises to explain how LCRs reduce fair competition, resulting in lower trade and productivity, which ultimately lowers world economic output and overall human welfare. Countries around the world are investigated with specific attention to the US, China, Indonesia, and resource-intensive countries, including mining-intensive ones. The book also presents product and firm level analyses, answering the question of why countries adopted LCRs and how LCRs actually affect the world economy.

A useful resource that will interest policymakers, researchers and advanced undergraduates interested in international trade, industrial policy, political economy, labour economics, and development economics.





## National Plastic Action Partnerships (NPAP): A Multistakeholder Approach to Addressing Plastic Pollution in Developing Countries

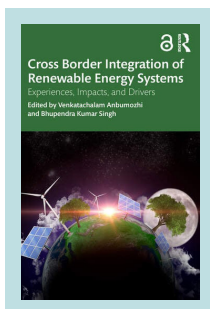
by Vivek Anand Asokan, Muchamad Muchtar, Abubakari Ahmed, Do Thi Thu Trang, Takashi Ohtani, Hoang Minh Giang, Budhi Setiawan, Ngoc-bao Pham, Premakumara Jagath Dickella Gamaralalage



This report by the Institute for Global Environmental Strategies (IGES) and Center for Global Commons at the University of Tokyo (CGC), prepared with the support of RKC-MPD ERIA, aims to see what can be learned from National Plastic Action Partnerships (NPAP) initiative in Indonesia, Ghana, and Vietnam. It describes the challenges of plastic pollution and the need for Multi-Stakeholder Partnerships (MSP) and describes an emerging MSP process called Global Plastic Action Partnership (GPAP) and its sister NPAP counterparts in developing countries. NPAP aligns the divergent interests of various stakeholders such as perspectives, targets, priorities, and timelines of all stakeholders, thereby trying to engineer change. In this context, the following questions are examined in this report:

How can Multi-Stakeholder Partnerships manage plastic pollution in developing countries?

What are the challenges?



## Cross-Border Integration of Renewable Energy Systems Experiences, Impacts, and Drivers

Edited by Venkatachalam Anbumozhi, Bhupendra Kumar Singh

Cross-border energy trade and the integration of renewable energy have become increasingly vital for countries and regions aiming to meet energy demands efficiently, reduce costs, and promote socio-economic stability while addressing climate concerns in the volatile energy market. This book delves into various global energy trade models between regions, highlighting their advantages and challenges, with a particular emphasis on India's Northeast region. South and Southeast Asian countries possess abundant renewable energy resources. This publication scrutinises the energy portfolios of nations such as India, Myanmar, Thailand, Bangladesh, and Bhutan, amongst others, as well as their initiatives to create more interconnected markets and foster renewable energy adoption within the region. It underscores the potential of Northeast India, given its natural wealth and strategic positioning, to facilitate cross-border energy trade with ASEAN nations. The book offers in-depth analysis on the driving forces, constraints, opportunities, and barriers involved, as well as potential measures that countries can implement to address institutional, financial, policy, and governance issues. These actions aim to minimise the overall costs of energy security and maximise socio-economic benefits for the populations in these regions. Furthermore, it identifies essential prerequisites, including grid flexibility, policy enhancements, market mechanisms, and regulatory solutions, essential for facilitating clean energy trade. The volume contributes to the advancement of low-carbon development and informs policy formulation by concentrating on the integration of renewable energy across international borders. This volume will be of significant interest to students and researchers specialising in energy and climate studies, environmental politics, trade, economics, and international relations.



## Digital Technology Utilization in the Agriculture Sector for Enhancing Food Supply Chain Resilience in Asean: Current Status and Potential Solutions

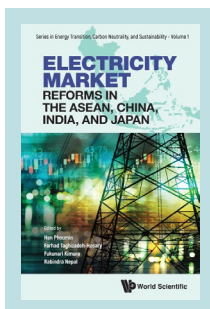
By Jose Ma. Luis P. Montesclaros, Paul Teng, Mely Caballero-Anthony

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ERIA led a comprehensive research project titled 'Enhancing Food Supply Chain Resilience and Food Security in ASEAN with Utilisation of Digital Technologies,' spearheaded by Masanori Kozono and Venkatachalam Anbumozhi. The aim was to support ASEAN in drafting the 'ASEAN Guidelines on Promoting the Utilisation of Digital Technologies for ASEAN Food and Agricultural Sector,' which received endorsement at the 43rd meeting of the ASEAN Ministers on Agriculture and Forestry on 27 October 2021.

As part of this initiative, a study was conducted to assess the current status of digital technology utilisation in agriculture and food supply chains in ASEAN. Titled 'Digital Technology Utilisation in the Agriculture Sector for Enhancing Food Supply Chain Resilience in ASEAN: Current Status and Potential Solutions,' the study was co-conducted by the S. Rajaratnam School of International Studies (RSIS) at Nanyang Technological University and the Economic Research Institute for ASEAN and East Asia (ERIA). The study report, prepared by Montesclaros, Jose Ma Luis, Paul S. Teng, and Mely Caballero-Anthony of RSIS in 2023, categorises digital technologies in agriculture into three main areas: digitalisation in production (agtech), supply chains (blockchain), and finance (fintech).

The report highlights a nascent adoption of these technologies in ASEAN, drawing findings from desk reviews, analysis of existing databases, virtual workshops, surveys with relevant ASEAN Sectoral Working Groups and Technical Working Groups in agriculture, and interviews with private sector experts.



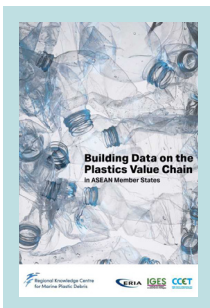
## Electricity Market Reforms in the ASEAN, China, India, and Japan

Edited by Han Phoumin, Farhad Taghizadeh-Hesary, Fukunari Kimura, Rabindra Nepal

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The electricity sector's reforms aim to modernise its infrastructure, rules, policies, and procedures to allow for more efficiency and for clean energy to have the same playing field in the power competition/wholesale/retail electricity market. This will enable inefficient power to be phased out gradually. Over the past 2 decades, there has been remarkable progress in the Association of Southeast Asian Nations (ASEAN) electricity markets that has increased the electrification ratio substantially; however, it has not achieved free market competition, universal electrification, and emission reduction plans. ASEAN aims to achieve universal access to electricity by 2030.

Electricity Market Reforms in ASEAN, China, India, and Japan provides 10 empirical studies investigating and evaluating the electricity market reforms in Southeast Asia, China, India, and Japan. The book analyses the electricity market policy reform plans, market liberalisation, tariff reform, electricity trade, renewable energy integration, resource allocation, and the sustainability of the electricity market in the region and these countries. It provides policy recommendations to foster the reforms and increase market efficiency.



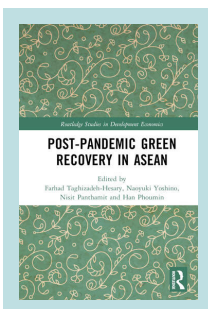
## Building Data on the Plastics Value Chain in ASEAN Member States

By Vivek Anand Asokan, Amila Abeynayaka, Yasuhiko Hotta  
Edited by Michikazu Kojima, Stefan Wesiak

This report by the Institute for Global Environmental Strategies (IGES) for RKC-MPD ERIA aims to provide an overview of the information related to the plastics value chain in the ASEAN region. It focuses on the availability of local and national data used for material flow analyses (MFAs) – instead of actual data content – as this information aims to be a stocktaking exercise towards building capacity in the area of data collection on the plastics value chain. Indeed, data on plastics are necessary to assess, plan, and implement solutions to mitigate marine plastics pollution. In this context, the following questions are examined in this report:

- What is the data collection capacity of ASEAN Member States (AMS)?
- What is the data availability on plastics in ASEAN across the plastics value chain?
- How can AMS improve data collection on plastics?





## Post-Pandemic Green Recovery in ASEAN

Edited by Farhad Taghizadeh-Hesary, Naoyuki Yoshino, Nisit Panthamit, Han Phoumin

ASEAN's real gross domestic product (GDP) had declined sharply due to the COVID-19 pandemic. The economic downturns and the uncertainty about the future reduced the new investments in green projects drastically. Besides this, many governments rolled back environmental regulations and taxes and increased fossil-fuel intensive infrastructure and electricity to stimulate economic growth. Post-Pandemic Green Recovery in ASEAN consists of several empirical studies using fresh data, with regional and country-level perspectives on ways to keep the greenness of the economic recovery plans.

The chapters look at various aspects and sectors, including tourism, infrastructure, energy, Small and Medium Enterprises (SMEs), employment, and livelihood, by assessing the effectiveness of various tools and instruments, including green finance, carbon taxation, green Sukuk, credit guarantee, cash transfer payment, power purchase agreements, and the related policies. They also provide practical policy recommendations useful for the ASEAN member states and other developing regions for the green recovery in the post-pandemic.

Reiterating the importance of green and low-carbon mechanisms and climate change tackling policies besides the usual economic recovery strategies, this book is a precious resource for the researchers of economics, finance, ASEAN and Asian studies, and policymakers.

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## About Eria

The Economic Research Institute for ASEAN and East Asia (ERIA) is an international organisation providing research and policy support for ASEAN and the broader East Asia region and the ASEAN and East Asia summit processes. ERIA's policy research focuses on three pillars: deepening economic integration, narrowing developing gaps, and achieving sustainable development in the region.

ERIA's establishment was formally agreed amongst 16 heads of government at the Third East Asia Summit in Singapore on 21 November 2007. It works closely with the ASEAN Secretariat, researchers, and research institutes from East Asia.

ERIA is based in Jakarta, Indonesia



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