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ERIA POLICY BRIEF

Strengthening Supply Chain Resilience in ASEAN: Firm Responses to Trade Shocks, Sustainability, and Digital Transformation

Key Messages:

1. **ASEAN firms are adapting to trade shocks, geopolitical uncertainties, and sustainability imperatives** by diversifying procurement, production, and markets, but diversification alone does not guarantee resilience.
2. **Building resilient supply chains requires co-ordinated ASEAN action** to facilitate free trade, harmonise standards, strengthen regional connectivity, and promote industrial upgrading.
3. **Decarbonisation and digital transformation remain uneven,** particularly amongst MSMEs facing financial, technical, and capability constraints.
4. **ASEAN's long-term competitiveness** will depend on integrating resilience, sustainability, and digitalisation into regional industrial and supply chain strategies in a co-ordinated way.

Recent years have exposed global supply chains to unprecedented uncertainty arising from the COVID-19 pandemic, geopolitical tensions, rising protectionism, sustainability pressures, and rapid digital transformation. Most recently, tariff measures introduced under the second Trump administration have further intensified uncertainty for firms operating across international production networks. Drawing on firm interviews and surveys of Japanese, other multinational, and ASEAN local firms, this policy brief examines how businesses are responding to four interconnected challenges: (1) evolving US trade policy, including reciprocal tariffs; (2) broader supply chain uncertainty; (3) decarbonisation requirements; and (4) digital transformation. It finds that firms are increasingly diversifying procurement, production, and markets, investing in digital technologies, and integrating sustainability into business strategies, while continuing to face significant policy, regulatory, and investment constraints. The brief argues that geographical diversification alone is insufficient to ensure resilient supply chains. Instead, ASEAN's long-term competitiveness will depend on coordinated policies that strengthen regional integration, industrial upgrading, decarbonisation, and digital transformation. It concludes with policy recommendations for reinforcing ASEAN's position as a resilient, competitive, and sustainable global production hub.

1. Introduction

East Asia, including ASEAN, has developed one of the world's most sophisticated and deeply integrated global supply chains (GSCs), driven largely by multinational enterprises (MNEs) in the electronics and automotive industries (Kimura and Oikawa, 2022). However, the operating environment for GSCs has changed significantly in recent years due to the COVID-19 pandemic, rising protectionism, geopolitical risks including US–China trade tensions, growing sustainability requirements such as decarbonisation, and rapid digital transformation (Anbumozhi , Kimura, and Thangavelu, 2020). More recently, tariff measures introduced under the second Trump administration have added further uncertainty to global production networks. Together, these developments have prompted firms to reassess traditional efficiency-driven supply chain models and place greater emphasis on resilience, adaptability, and risk management (Figure 1).

Against this backdrop, how are firms responding to these multiple uncertainties, and what challenges do they continue to face? More importantly, what policy measures are needed to strengthen resilient and sustainable supply chains in ASEAN?

To address these questions, ERIA and the Institute of Developing Economies, Japan External Trade Organization (IDE–JETRO), together with members from the Research Institute Network (RIN) launched a joint study to examine firm-level responses to emerging supply chain risks and develop policy recommendations for ASEAN Member States and regional institutions. This Policy Brief draws on primary evidence from more than 40 interviews with multinational enterprises and ASEAN local firms, complemented by three business surveys: the JETRO Survey covering more than 500 Japanese manufacturing firms operating in five ASEAN Member States, the ASEAN Business Advisory Council (ASEAN-BAC) Business Survey of around 400 ASEAN local firms, and a CSIS Indonesia survey of 29 firms. Together, these data provide insights into how firms are responding to evolving US trade policy, broader supply chain uncertainty, decarbonisation pressures, and digital transformation, and the policy priorities needed to strengthen ASEAN's position as a resilient and competitive global production hub.

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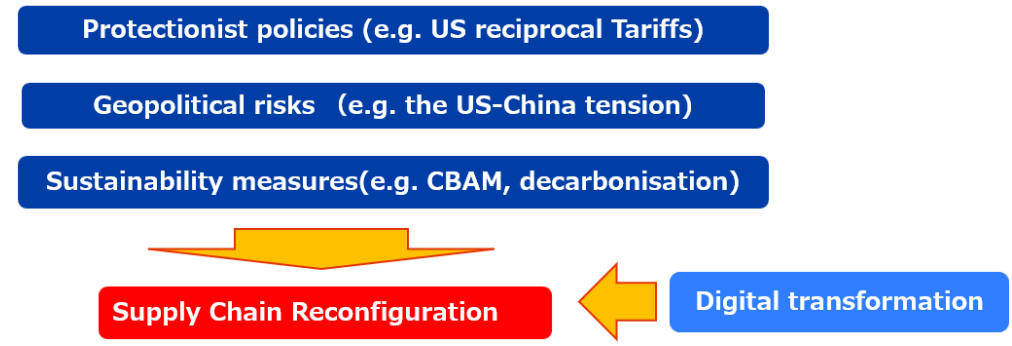
Figure 1. Changes in the Global Supply Chain Environment



Source: Compiled by authors.

2. Impacts of US Trade Policy (Reciprocal Tariffs)

A major recent shock to supply chains in ASEAN and East Asia has been the introduction of reciprocal and additional tariffs by the United States, ranging from 10% to 40%. Unlike the first Trump administration, when tariffs were largely directed at China and indirectly benefited ASEAN through trade diversion (Hayakawa, 2022), the second Trump administration extended reciprocal tariffs to several ASEAN economies. At the same time, the US–China summit in October 2025 reduced US tariffs on Chinese imports to 20%, eroding ASEAN's earlier tariff-related competitive advantage.

Despite these developments, ASEAN exports to the United States increased by around 30% year-on-year in 2025, while US imports from China declined sharply. As a result, ASEAN's share of the US trade deficit rose to 26.5% in 2025 (Figure 2), increasing the likelihood of greater US scrutiny of transshipment practices and rules-of-origin compliance.

The ASEAN-BAC Business Survey reveals that nearly two-thirds of the manufacturing firms in ASEAN participated in the survey have been affected by the new tariff measures, primarily through supply chain disruptions, logistics delays, increased business uncertainty, and customer pressure to reduce prices. Nevertheless, ASEAN exports to the United States have continued to expand, suggesting that firms have adapted their operations despite heightened uncertainty. At the same time, several economies have experienced increased inflows of Chinese products diverted from the US market, creating additional competitive pressures for domestic industries.

3. Firms' Responses to Supply Chain Uncertainty

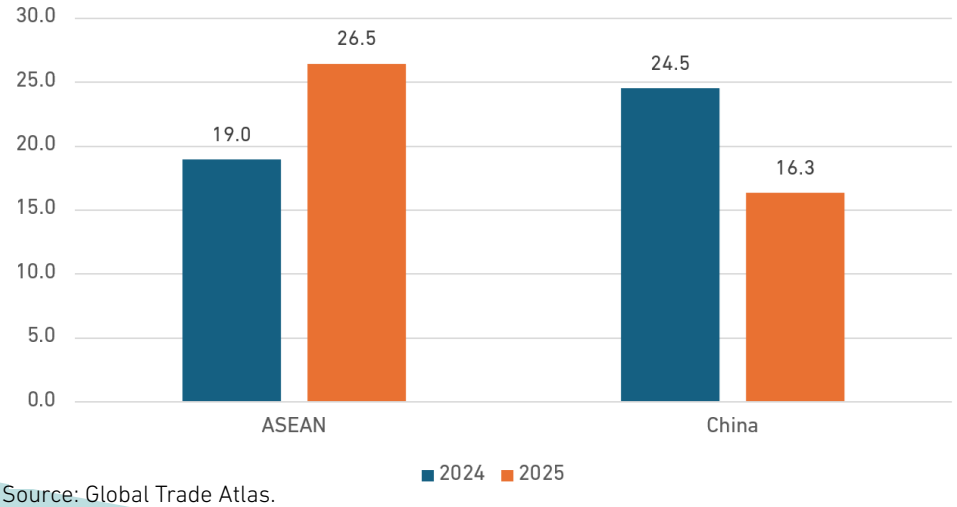
Interviews with Japanese firms indicate that the COVID-19 pandemic accelerated efforts to diversify procurement, increase local sourcing, and strengthen business continuity planning for geopolitical risks. Production shifts from China to ASEAN continue, although these are occurring primarily through the expansion of existing facilities rather than new greenfield investments. Many firms are simultaneously pursuing a 'in China for China' strategy by localising production for the Chinese domestic market.

A persistent challenge is limited visibility beyond first-tier suppliers. Many firms have insufficient information on second- and third-tier suppliers, making it difficult to identify vulnerabilities further upstream in their supply chains.

Amongst ASEAN local firms, the ASEAN-BAC Business Survey shows that protectionism remains the greatest concern (75.0%), followed by decarbonisation requirements (53.1%) and geopolitical risks (38.7%). Many firms also report uncertainty arising from limited market information and increasingly complex regulatory environments.

Procurement strategies have been widely revised. Around 60.6% of surveyed firms reported changes to their procurement practices, with greater emphasis on ESG compliance (76.5%) and supplier diversification (71.6%). Nearly half (44.7%) diversified procurement across borders, with ASEAN emerging as the preferred destination for 93.2% of these firms. However, firms continue to face significant challenges, particularly higher procurement costs (90.0%) and difficulties meeting sustainability requirements (78.8%). Chinese suppliers remain important because of their competitive cost and product quality.

Figure 2. ASEAN and China's Share of the U.S. Trade Deficit (%)



Source: Global Trade Atlas.

More than half of surveyed firms also revised their market and sales strategies, placing greater emphasis on expanding within ASEAN and adopting e-commerce platforms. However, tariff barriers and regulatory differences across markets continue to constrain regional expansion. Small and medium-sized enterprises (SMEs), in particular, face significant information gaps regarding overseas markets and geopolitical risks.

4. Firms' Responses to Decarbonisation

The JETRO Survey shows that 53.3% of Japanese firms operating in ASEAN are already implementing decarbonisation measures, rising to almost 80% when planned initiatives are included. The most common actions are energy-efficiency improvements (69.7%), emissions measurement (48.6%), rooftop solar installations (40.2%), and renewable energy adoption (37.2%). However, only 7.1% reported switching to low-emission suppliers or encouraging suppliers to reduce emissions, indicating that progress on Scope 3 emissions remains limited. The principal obstacles are the high cost of renewable energy, limited financial and human resources, and insufficient policy incentives.

Chinese firms exhibit a dual pattern. Those integrated into sustainability-oriented global value chains have generally adopted greener business practices in response to customer and regulatory requirements, while others continue to struggle with financial constraints, higher product costs and limited access to low-carbon technologies.

Amongst ASEAN local firms, 63% reported undertaking decarbonisation measures, rising to 75% amongst manufacturing firms. Participation is significantly higher amongst larger firms than MSMEs. The most common initiatives include energy-efficiency improvements, followed by electric vehicle adoption, renewable energy use, and environmentally friendly packaging. Financial constraints and limited technical capacity remain the principal barriers.

Interviews with firms across ASEAN reveal a consistent set of interconnected challenges. Drawing on both the interviews and the wider literature, these barriers are summarised in Annex Table 1.

5. Firms' Responses to Digitalisation

More than half of Japanese firms surveyed have introduced digital technologies, particularly factory-level digital transformation, cybersecurity systems, cloud services, and artificial intelligence. However, digital tools that improve end-to-end supply chain visibility remain relatively limited because firms often lack reliable information on upstream suppliers. The most significant constraints are shortages of digital talent (70.8%) and high implementation costs (64.7%).

Digital adoption amongst ASEAN local firms remains comparatively modest. Although some firms have begun using artificial intelligence for decision-making and knowledge management, many continue to face financial constraints, uncertain returns on investment, limited technical expertise, and insufficient digital literacy.

Country-level evidence also reveals considerable differences in digital readiness (Annex Table 2).

6. Policy Recommendations

The findings presented above show that firms are responding to growing uncertainty by diversifying procurement, production, and markets, while investing in decarbonisation and digital transformation. The continued relocation of production from China to ASEAN has reinforced the region's role in global manufacturing networks. As a result, ASEAN exports to the United States continued to grow in 2025 despite the introduction of reciprocal tariffs, demonstrating the region's capacity to adapt to changing trade conditions.

However, geographic diversification alone does not guarantee supply chain resilience. New production locations can themselves become sources of vulnerability if they lack reliable infrastructure, efficient logistics, supportive institutions, or adequate local supplier ecosystems. Building resilient supply chains therefore requires improvements across the broader operating environment rather than simply relocating production. These include trade facilitation, stronger physical and institutional connectivity within and beyond ASEAN, industrial upgrading, supplier development, and closer regional co-operation on sustainability, digitalisation, and risk management.

Accordingly, policy priorities should be co-ordinated at both the national and ASEAN levels over the short, medium, and long term, as outlined in Annex Table 3.

In the short term, governments should focus on mitigating risks arising from evolving US trade policy by strengthening rules-of-origin enforcement, enhancing monitoring against transshipment, and improving customs efficiency to reduce compliance costs. Providing MSMEs with timely information on geopolitical developments and practical guidance will also help smaller firms respond more effectively to external shocks.

In the medium term, ASEAN should deepen regional economic integration by reducing non-tariff barriers, harmonising standards, and improving physical and digital connectivity. Leveraging the ASEAN Economic Community (AEC), the Regional Comprehensive Economic Partnership (RCEP), and ASEAN+ free trade agreements will help firms diversify markets while strengthening regional resilience. ASEAN should also enhance collective preparedness for supply chain disruptions through contingency planning, early warning systems, and co-operation on critical materials and maritime transport.

In the long term, ASEAN's competitiveness will depend on industrial upgrading, stronger regional supplier networks, and continued investment in decarbonisation and digital transformation. Expanding renewable energy, improving access to green finance, strengthening sustainability reporting, developing digital infrastructure, enhancing supply chain visibility, and investing in digital skills will all be essential. Coordinated implementation of these policies across ASEAN will reinforce the region's position as a resilient, competitive, and sustainable global production hub.

Acknowledgements

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Annex Table 1. Key Barriers to Decarbonising Industrial Supply Chains in Asia

Barrier	Examples
Economic	High upfront investment requirements, hidden costs, limited expected returns
Market	Limited access to low-carbon technology markets, weak market incentives, limited consumer demand
Information	Insufficient emissions data, limited awareness of available technologies and benefits, weak analytical capacity
Organisational	Limited management commitment, resistance to organisational change, weak co-ordination across supply chain partners

Source: Authors' compilation based on firm interviews and the literature.

Annex Table 2. Status of Digital Technology Adoption and Key Challenges

Country	Status of Digitalisation and Key Challenges
Indonesia	Many firms have introduced digital and cybersecurity measures, but capability gaps, regulatory uncertainty, and financial constraints remain significant.
Malaysia	Digitalisation is widely recognised as important, but interoperability challenges, cross-border data regulations, and shortages of skilled personnel hinder progress.
Philippines	ERP systems are widely used, but adoption of IoT and AI remains limited, particularly amongst upstream suppliers.
Thailand	Automotive and electronics firms have introduced ERP, Manufacturing Execution Systems (MES), and digital dashboards, although high investment costs remain a major constraint.
Viet Nam	Limited digital skills and organisational readiness continue to slow adoption.

Source: Firm interviews.

Annex Table 3. Policy Recommendations for Strengthening Supply Chain Resilience under Multiple Uncertainties

Time Frame	Policy Priority	Illustrative Measures
Short term	Respond to evolving US trade policy	Strengthen monitoring of transshipment through regional co-operation; enhance rules-of-origin compliance and verification; improve customs procedures, including further development of the ASEAN Single Window; provide MSMEs with timely geopolitical intelligence and practical risk-management guidance.
Medium term	Deepen ASEAN integration and diversify markets	Reduce non-tariff barriers through harmonisation of standards and certification procedures; strengthen connectivity through the AEC, RCEP, and ASEAN+ FTAs; expand engagement with emerging markets; develop ASEAN-wide contingency plans for maritime transport disruptions and supply shocks; strengthen early warning systems and regional information sharing on critical materials and supply chain risks.
Long term	Enhance competitiveness through industrial upgrading, decarbonisation, and digitalisation	Support supplier upgrading and MSME development; strengthen regional industrial strategies; expand renewable energy deployment and access to green finance; build MSME capacity for sustainability reporting and green supply chains; invest in digital infrastructure, shared platforms for supply chain visibility, and digital skills development; advance implementation of the ASEAN Digital Economy Framework Agreement (DEFA).

Source: Authors.

ERIA

Sentral Senayan II, 5th, 6th, 15th floors
Jalan Asia Afrika No. 8
Senayan, Central Jakarta 10270, Indonesia
Tel: (62-21) 57974460
E-mail: contactus@eria.org