

# Asian Supply Chain Champions in a New World of Trade

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# Executive summary

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Amid a backdrop of intensified geopolitical tensions and the lingering fallout of COVID-19, emerging Asian economies are vying for the coveted “China-plus-one” position as businesses globally recalibrate their operational strategies.

China still retains a pivotal role in global supply chains given its mature manufacturing base, strong R&D, and digital innovation, but multinational corporations have accelerated their search for additional countries to fortify their supply chains and reposition their business models for resilience, agility, and growth.

Simultaneously, as new growth industries emerge, companies are prioritizing economies that offer a strong market potential, and a confluence of abundant, high-quality, and cost-effective labor, digital readiness, capacity for innovation, openness to trade, and robust sustainability and worker protection practices.

This briefing explores evolving trade patterns, highlighting the surge in intra-Asian trade and growing economic cooperation among emerging economies, or south-south trade. It identifies opportunities for manufacturing growth for Asian economies, both for exports and future domestic consumption.

The focus is on Asian economies with a nominal GDP per capita below US\$13,000, lower than that of China’s, which have either attracted significant investment interest in manufacturing or witnessed a shift in trade flows, riding the trend of supply chain diversification.

To delve into the readiness of these economies to capture new manufacturing opportunities, the Asia Business Council developed an Asia Manufacturing Diversification Index. The Index evaluates the attractiveness of ten emerging Asian economies alongside China as integral players within the modern manufacturing value chains.

This report aims to illuminate the path for businesses striving to effectively navigate new trade dynamics, thereby enhancing their supply chain resilience, and positioning themselves strongly in a dynamically changing global trade environment. It provides an analytical lens to identify and leverage the strengths of various countries amid prevailing uncertainties. It supplies recommendations and case studies on how countries can improve their competitiveness to attract corporate investment and unlock fresh opportunities for economic growth.

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# Introduction

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In a rapidly changing and increasingly digital economic landscape, companies are recalibrating their global operations to enhance efficiencies, reach new markets, and meet growing expectations and requirements in sustainability and labor practices. This strategic pivot underscores the imperative for businesses to establish their footprint in countries that can meet these evolving criteria.

Moreover, the intensification of geopolitical frictions and the imperative to fortify global supply chains against potential disruptions are compelling businesses to diversify their operational bases beyond traditional hubs, notably China, which has long served as the cornerstone of international commerce.

China continues to be an indispensable pillar of global trade. Firms are still actively engaged and doing business in China, but are simultaneously diversifying their operations under the “China-plus-one” or even “China-plus-many” approaches to mitigate risks and leverage emerging opportunities. The race among other Asian nations to secure the “plus-one” status is intensifying, necessitating unique value propositions to attract global businesses looking for complementary locales for expansion.

The changing global landscape offers Asian nations, aside from China, new opportunities to strengthen their roles in regional and global supply chains. They must evolve from being seen as sources of cheap labor to becoming hubs of technological innovation, trade openness, and adherence to environmental and labor standards. This evolution is crucial as they navigate the shift in international trade dynamics, including the partial U.S.-China decoupling in selected sectors and increased intra-Asian and south-south trade. This briefing will explore how these countries can enhance their attractiveness to businesses by focusing on essential factors for their future growth.

The performance of ten Asian countries, plus China, along these factors is explored, using the Asia Manufacturing Diversification Index, created by the Asia Business Council for this purpose, and case studies that highlight these principles in action.



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# Diversification and U.S.-China Partial Decoupling Open Doors for New Asian Players

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The push for diversification and the ongoing trajectory of partial U.S.-China decoupling have reshaped international trading patterns, energized new exchanges, and elevated the role of emerging economies in Asia as key trade contributors.<sup>1,2</sup>

Both the U.S. and China are now forging economic relationships with countries that are geographically, and in some cases, geopolitically closer, to create more reliable and secure supply chains. They are also expanding their trade networks across different regions to enhance their ability to withstand potential disruptions. World Trade Organization analyses suggest that there has been minimal “reshoring” of supply chain activity back to the U.S.<sup>3</sup> The redirection away from China of global supply chains serving the U.S. market has benefitted Mexico, as well as geographically distant countries. This trend points to continued opportunities for emerging Asian economies beyond China to become more integrated into global value chains.

Efforts to diversify U.S. supply chains away from China may have inadvertently strengthened indirect trade relationships.<sup>4,5</sup> The countries that have benefitted the most from the redirection of U.S. trade are all strongly integrated into China’s supply chains, except India. China is running a trade surplus with nations such as Vietnam, Singapore, and Mexico, all of which are experiencing growing trade surpluses with the U.S.<sup>6</sup> Moreover, the network of indirect supply chain ties to China has broadened in areas involving strategic goods. Notably, the leading exporters of such goods to the U.S. have ramped up their procurement of intermediate goods from China, particularly noticeable in the electronics sector, where China has witnessed the largest drop in its market share in the U.S.<sup>7</sup>

Recent trade flows indicate that there is resilient global demand for goods manufactured internationally.<sup>8</sup> The steady demand for intermediate goods also suggests that products continue to be made through extensive supply chains.<sup>9</sup> Players in those chains are, however, changing as trading patterns evolve.

## Intra-Asian and South-South Trade Unlock Fresh Opportunities

The continued growth of regional trade within Asia is carving out significant export manufacturing roles for emerging Asian economies, largely fueled by ASEAN countries’ growing exports to China and other North Asian markets. China remains a key trading ally across Asia.<sup>10</sup> The dynamics of this trade landscape are further energized by the advent of major trade pacts such as the Regional Comprehensive Economic Partnership (RCEP) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), crafting the world’s most extensive free-trade zone.

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This upswing in intra-Asian trade is also catalyzing a new pattern of production specialization.<sup>11</sup> Components from North Asia are increasingly assembled in Southeast Asia, reflecting a strategic shift by firms from China, Japan, and South Korea to mitigate operational costs and navigate the trade barriers emerging from heightened geopolitical frictions.

## Emerging Asia Shines as Plus-One for Chinese Solar Companies

Chinese solar companies are expanding some of their supply chains out of the mainland to other parts of Asia, as they seek to bypass foreign duties on Chinese solar imports and capitalize on lower operational costs elsewhere.

U.S. and European governments' stricter scrutiny, often resulting in steeper tariffs, on the use of solar-grade polysilicon from Xinjiang—a Chinese province where there have been reports of forced labor—in Chinese solar exports, have prompted mainland solar companies to complete the final assembly of products in other emerging Asian economies, to circumvent the “made-in-China” tag and avoid duties.<sup>12</sup>

Vietnam, Malaysia, and Thailand have become the preferred destinations as they offer cheaper labor and proximity, facilitating the efficient transportation of components and operational efficiencies. These countries are also very supportive of the solar sector generally, implementing tax incentives to boost domestic renewable energy projects. This gives Chinese companies not only a manufacturing outlet for exports but also easier access to growing markets for solar energy.<sup>13</sup>

Trina Solar is one example of a Chinese solar company that has moved some of its production to Vietnam after receiving punitive duties from the U.S. on its products made in Thailand.<sup>14</sup> Reuters reported that Trina Solar's operations came under further scrutiny in 2022 when U.S. Customs and Border Protection seized 1,053 shipments of solar energy equipment, some potentially made with polysilicon from Xinjiang.<sup>15</sup>

## The Need to Upscale

Starting from June 2024, Chinese solar companies will not only confront steep U.S. tariffs targeting duty circumvention. The European Commission is also mulling anti-dumping probes against China and further tariffs to protect and rejuvenate Europe's struggling solar industry.<sup>16</sup> These additional tariffs may prompt some Chinese solar manufacturers to gradually put the brakes on their output. This development could prompt a realignment in Southeast Asia's solar industry to evolve beyond assembly operations, potentially sparking regional innovation and reshaping the global solar landscape.

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That said, China holds significant reserves of several critical raw materials needed for solar panel production, such as polysilicon, which is essential for photovoltaic cells. Beyond just reserves, China has invested heavily in the entire supply chain of these materials, from mining to processing, ensuring a steady supply for its solar industry. Emerging economies such as Vietnam and Thailand also depend heavily on Chinese investment and expertise to drive their growth and innovation in specialist sectors like solar energy, in contrast to Asian powerhouses like China, South Korea, Taiwan, and Japan which can leverage their substantial gross lead in research and development.

Additionally, south-south trade among economies of parallel development stages has been increasing since the mid-2000s and should provide Asian economies an additional trade avenue.<sup>17</sup> China, in particular, has emerged as a key player in this evolving landscape, expanding its footprint in the trade of parts and components with Africa, the Commonwealth of Independent States, and the Middle East.

## China Still Dominates, Other Emerging Asian Economies Battle for “Plus-One”

As noted in the previous sections, China is still central to global trade, underscoring its robust grip on global manufacturing. China’s share of world manufacturing value-added climbed to 28.7% in 2023 from 26.3% in 2020.<sup>18</sup> It continues to supply a broad range of products, including those deemed advanced technology by the U.S. government, where it continues to rank among the top three suppliers.<sup>19</sup>

Simultaneously, the push for diversification in supply chains, known as the China-plus-one strategy, is gaining momentum.<sup>20</sup> Insights from the Asia Business Council, coupled with a 2022 Gartner survey, reveal a nuanced shift among global supply chains.<sup>21</sup> A clear trend involves maintaining operations within China's robust manufacturing ecosystem and expanding into other, primarily developing, markets. This strategy underscores a deliberate balance between leveraging China's unmatched manufacturing capabilities and mitigating risks by broadening the geographical footprint of supply chains.

## India and Vietnam Key for Consumer Electronics Amid China-Plus-Many Strategy

Apple Inc. stands out as a key player among Western consumer electronics companies engaging in a China-plus-many approach. It has been shifting some of its supply chain out of China to India and Vietnam following revenue setbacks due to labor shortages and Beijing-imposed restrictions during the COVID-19 pandemic, which had underscored the risks associated with companies largely dependent on a single country for their operations.

India has emerged as an attractive destination for Apple's main smartphone supplier, Foxconn Technology, after Indian Prime Minister Narendra Modi availed production-linked subsidies to attract foreign investments.<sup>22,23</sup> Meanwhile, Vietnam has also become a significant production base for Apple's AirPods and HomePods, with facilities run by Luxshare and Inventec, Apple's primary assembly partners for these products.

That said, Foxconn has maintained a significant presence in China as it is extremely cost-effective—a critical factor for smartphone makers requiring high-volume production at speed.

## Division of Labor

Apple has elected to manufacture its most valuable product, the iPhone, in India, given the country's talent pool of engineers, strong research and development stance, and capacity for innovation. In addition, Apple will now have greater access to India's rising middle class, helping to boost smartphone demand there.

Meanwhile, the production of lower-value products like AirPods has shifted to Vietnam, which has long been viewed as a lower-end manufacturing base. Vietnam's appeal comes from its relatively lower labor costs and geographic proximity to China. That said, Apple is set to also transfer some of its critical product development efforts for the iPad to Vietnam.<sup>24</sup> Collaborating with BYD, a major Chinese assembler, Apple aims to transfer new product introduction (NPI) resources to Vietnam. This is unprecedented for the company, which previously conducted most of its NPI activities in China in coordination with its engineers in Cupertino, California. This shift is largely driven by the need to navigate growing geopolitical uncertainties and Vietnam's favorable trade relations with major markets such as the U.S. and Europe. Trade agreements have reduced duties on Vietnamese imports, and the U.S. has specifically committed to supporting Vietnam's electronics sector. Vietnam's growing capacity for innovation is a supportive factor as well.

While Apple and other consumer electronics companies have yet to diversify into Indonesia on a meaningful scale, the country emerges as a promising alternative as a part of a “plus-many” approach, thanks to its large consumer market and substantial labor force.

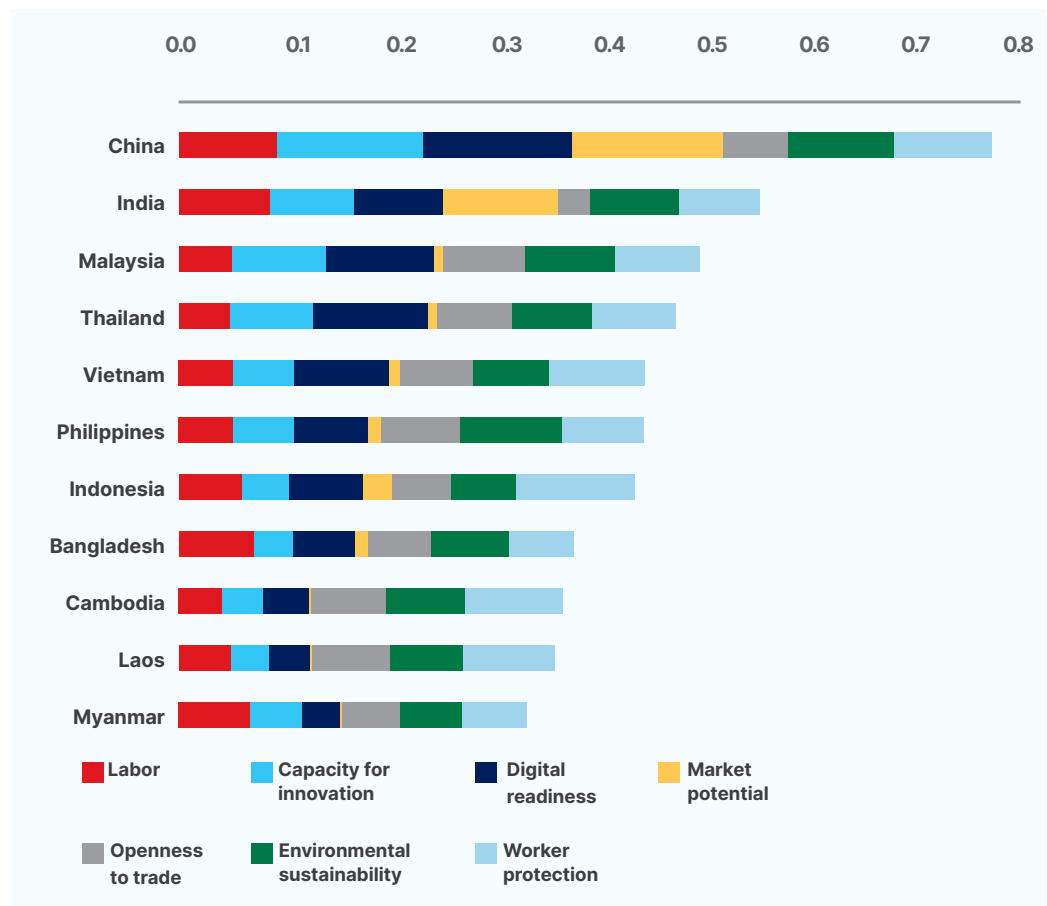
## Chinese Firms Also Adopt Plus-One for Global Expansion

Chinese companies themselves are also adopting “plus-one” strategies to leverage attractive government subsidies and expand their market access.<sup>25</sup> Beijing-based smartphone maker Xiaomi Corp., for instance, has partnered with India's Padget Electronics to assemble smartphones and other electronics products in the northern state of Uttar Pradesh.

While Apple's move to India was aimed at primarily reducing its reliance on China, Xiaomi could also meet increasing domestic consumer demand for smartphones, with India being the world's second-biggest smartphone market behind China.

# Winning Factors for Other Asian Countries to Attract Global Supply Chains

This segment examines the key factors determining the appeal and significance of emerging Asian manufacturing economies within supply chains. The Asia Business Council’s framework, the Asia Manufacturing Diversification Index, seeks to show where emerging Asian economies stand in their potential to grow their contributions to global manufacturing. The Index compared ten aspiring “China-plus-one” economies across a range of relevant indicators underlying manufacturing attractiveness as compared to China. The overall Index results are shown below (see Figure 1). China remained first in manufacturing attractiveness, India a distant second, followed by Malaysia and Thailand. The detailed results for the sub-indices, included in Appendix 1, provide a more nuanced view of the relative areas of strength and weaknesses of each economy, as each seeks to play a growing role in labor-intensive manufacturing, as well as develop capabilities for the more technology-intensive manufacturing of the future.



**FIGURE 1**  
ASIA MANUFACTURING DIVERSIFICATION INDEX  
ASIA BUSINESS COUNCIL



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## Beyond Labor Costs: Value Chains Evolve Past Low-Cost Labor

Global value chains have typically been influenced by differences in labor costs across economies. However, changes in trade flows since 2018 show that labor cost differences have played a diminishing role in the redistribution of global manufacturing.

Countries known for low labor costs, such as Laos, Myanmar, the Philippines, and Indonesia, have all seen a decline in their manufacturing export shares. Bangladesh's share increased only marginally by 1%. In contrast, China grew its share to nearly 30% despite its high labor costs and continued to lead in labor-intensive manufacturing, over countries like India, Bangladesh, and Vietnam.<sup>26</sup> In the realm of technology-focused industries, importing countries are increasingly placing supply chains in geopolitically friendly economies instead of prioritizing labor costs.<sup>27</sup>

Moreover, a 2023 Japan External Trade Organization (JETRO) survey on Business Conditions of Japanese Companies Operating in Asia and Oceania highlights a shift in manufacturing cost dynamics.<sup>28</sup> Due to input cost increases following the COVID-19 pandemic and war on Ukraine, operational costs are now predominantly driven by materials, components, energy, and transportation expenses, rather than labor costs. This change, combined with the impact of lead times, accentuates the critical importance of labor availability and productivity over mere cost considerations.

Labor shortages have also become a significant challenge across Asian manufacturing.<sup>29</sup> These shortages, often worsened by precarious working conditions, disproportionately affect lower-cost economies, such as Laos, particularly as they reactivate manufacturing labor post-pandemic. Accordingly, the adoption of production automation is accelerating, also spurred by rising labor costs, the need for more sophisticated production techniques, and the decreasing costs of automation technologies. This trend is likely to persist, driven by demographic changes that forecast more labor shortages and higher costs. Automation presents a viable solution to these challenges, emphasizing efficiency and cost-effectiveness. In the Index, Malaysia has the top labor productivity score, followed by Thailand and China, which receive equal scores (see Figure 2).

## Automation and AI Reshape Labor Demand for Supply Chains

Technological advancements, particularly in automation and artificial intelligence (AI), have reshaped the demand for labor. Economies with workforces capable of handling higher-skilled tasks and complex operations are becoming more attractive.

Countries like India, Malaysia, Bangladesh, and Indonesia are uniquely positioned to benefit from the demand for both technology-driven and labor-intensive manufacturing, thanks to their large, skilled labor forces and competitive cost structures. Figure 2 in Appendix 1 compares the performance of Asian emerging economies on different labor factors, including labor availability, quality, and costs.

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As manufacturing industries continue to be reshaped by automation and digitization, workers' educational attainment, English proficiency, and productivity become even more valued, as human workers are required to take on complex and non-routine tasks that involve critical thinking and collaboration. At the same time, labor cost-effectiveness remains crucial for companies to remain competitive on a global scale.

### **Recommendations:**

**Upgrade Education Systems:** Enhance traditional and technological education to prepare workers for the evolving demands of the workforce. This involves not only fostering basic literacy and numeracy but also emphasizing Science, Technology, Engineering, and Mathematics (STEM); managerial skills; and soft skills like creative problem-solving and teamwork through higher education.

**Improve Vocational Training:** Support existing workers in staying abreast of labor market trends and acquiring new skills through government and employer-sponsored courses and on-the-job training. Encourage employers to facilitate skill upgrading by allowing time off for educational purposes.

**Boost Labor Force Participation:** Keep more people economically active, especially in aging Asian economies such as China and Thailand, or in countries where participation rates are close to 50%, such as Bangladesh and India. Consider re-evaluating wages, enhancing social support systems, and addressing working conditions to mitigate labor shortages.<sup>30</sup> Governments also need to remove regulatory obstacles that limit labor mobility and immigration and increase the workforce involvement of youth, women, and older workers. This will also help create more opportunities for underrepresented groups to thrive.

**Enhance Productivity:** Address the lag in labor productivity in Asia compared to global averages.<sup>31,32</sup> Emerging Asia's abundant labor force can only be turned into a demographic dividend if productivity is significantly improved. This can be achieved through further investments in education to upskill workers in a future era of manufacturing that will be more dependent on generative AI and greater automation.

## **Vietnam's Imperative to Raise its Skill Level**

Vietnam has inserted itself into global value chains by performing basic assembly functions, such as in the apparel sector, thereby fostering strong economic growth, creating numerous minimum wage jobs, and significantly reducing poverty.

More recently, the country has benefited from the redirection of U.S. export manufacturing away from China. Its geographic and cultural proximity with China has spurred the development of a vibrant trans-shipment export business and facilitated the movement of key materials between the two economies. With many Vietnamese factories being owned and managed by owners from mainland China and Hong Kong, Vietnam has also benefited from an active skills transfer, especially at the middle and higher management levels.

This advantage may not be sustainable. As Vietnam's labor costs have increased faster than inflation rates, and the country has exhausted its labor surplus, it now needs to move up the value chain. To do so, the country needs to narrow existing gaps in educational attainment and labor productivity, which could hamper Vietnam's ability to upgrade its manufacturing.

The Vietnamese government has developed a robust action plan to raise education levels and create a lean and smart labor force, capable of raising productivity at an accelerated rate. Education curricula have also been reformed to include skills in creativity, teamwork, problem-solving, continuous learning, problem-solving, and management. Australia's university of design and technology, RMIT, has also been invited to open a local campus to help cultivate essential business, technology, and AI skills for the manufacturing, supply chain and logistics management, and design technology sectors.

## Innovation Capacity and Digital Readiness Critical for Efficiency, Speed, and Reliability in Cutting-Edge Manufacturing

Recent shifts in trade flows indicate that countries with a superior ability to innovate have grown their share of exports more, even in labor-intensive sectors. Among the countries assessed, China, Malaysia, India, and Thailand exhibit the greatest innovation potential, with abundant graduates in science and engineering, relatively high research and development (R&D) spending, and with knowledge and technology translating into meaningful product offerings. The detailed results are shown in Figure 3, in Appendix 1.

A strong ability to innovate will help emerging Asian economies go from low-cost manufacturing hubs to new sources of ideas, in turn boosting exports and growing domestic demand. China stands out as the most innovative upper-middle-income country globally, with India and Vietnam leading the pack in the lower-middle-income category.<sup>33</sup> The Philippines and Indonesia also demonstrate notable innovation strengths.

Digital readiness is imperative in securing a competitive edge in manufacturing, where efficiency, speed, and cost optimization are key. Manufacturers, even in sectors conventionally reliant on manual labor, need to integrate digital technologies into all aspects of production, including product development, production planning, logistics, and customs clearance. This shift towards digitalization is further driven by the increasing emphasis on sustainability, pushing for collaborative, data-driven supply chains that support resource efficiency and emissions reductions.

According to the Council's Index (Figure 4), China leads in digital readiness, with Thailand, Malaysia, and Vietnam as top performers among emerging Asian economies seeking to be "China-plus-one" contenders. More digital-ready countries have been boosted by improved digital infrastructure and cybersecurity, as well as higher levels of digital literacy and technology adoption. In the future, higher worker competence in data analytics and generative AI will help factories adapt to automation and the more prevalent use of AI in manufacturing.

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## Recommendations:

### **Enhance R&D Investments and Facilitate Business-University Knowledge Exchange:**

Asian economies with strong concentrations of world-leading science and technology research and manufacturing activity (technology clusters), excel in innovation. China, Japan, and South Korea stand out with influential clusters that position them to compete in industries of the future. Identification of promising emerging clusters, and broad-based enabling policies to foster their growth, would be a good start for other emerging Asian economies.

**Improve Digital Infrastructure:** Boost internet speeds to improve production efficiency and enable automation. Index results show that Bangladesh, Cambodia, Indonesia, Laos, and Myanmar all have low internet speeds (Figure 4).

**Strengthen Cybersecurity and Data Management:** Countries like Cambodia, Laos, and Myanmar need to enhance their cybersecurity (Figure 4) by promoting cybersecurity education, increasing collaboration between government, private sector, and academia to ensure intelligence sharing and coordinated incident-response efforts, and enacting and enforcing cybersecurity laws and regulations that address cybercrime, data protection, and privacy. As cyber threats tend to be global, international cooperation is also vital.

**Streamline Customs Processes:** Accelerate the digitization of customs to alleviate supply chain bottlenecks, reduce trade costs, and overcome the trade friction that logistical and customs challenges cause.

## CASE STUDY

### How Shein Has Fully Digitized its Supply Chain

Chinese fast fashion retailer Shein is an example of a company that primarily operates through a digital presence and is using artificial intelligence and big data to keep up with clothing trends to meet consumer demand for quick, cheap and copious fashion.

The COVID-19 pandemic triggered changes in the fashion industry, giving new players such as Shein greater access to the market just as brick-and-mortar fashion businesses contended with supply chain problems due to a lack of materials, transportation bottlenecks, and rising transportation costs.

Shein has become one the most popular garment retailers in the world, having increased its share in the U.S. from 18% in 2020 to 40% in 2022. It achieved 568% sales growth during the pandemic from March 2020 to March 2022. With sales growth in the high double digits, Shein has outpaced other fast-fashion giants such as H&M and Inditex SA's Zara.

Shein's approach relies on advanced algorithms and AI, analyzing data from customers' website profiles, apps, and social media to not only predict but also create trends, while at the same time planning production volumes and selecting suppliers from its extensive network. This ensures that the company reduces costs with more flexible production and fewer errors when forecasting supply.

Shein uses custom-made tools alongside Google Trends Finder, plus it entices customers to be more interactive online as it gamifies the shopping experience with, for instance, rewards in the form of promotions.

Shein's phenomenal agility and speed are due to its supply chain management that is conducted in the Cloud, communicating with exclusive factories largely based in China's southern province of Guangdong using a mobile app similar to the one used by Uber. This model allows for fast and automatic ordering of products that are selling well. It also allows the company to process information more efficiently and develop key product innovation capabilities, cutting costs and time. Up to 6,000 new products can be added to Shein's online store daily based on AI analysis of customer trends.

## Market Access and Trade Openness: Quest for Balance Amid Trade Restrictions

Companies are increasingly considering locations for their production bases with a focus on high-potential consumer markets, as they anticipate future growth opportunities in these markets. Localization strategies promote better market access and enable manufacturers to serve markets with greater reliability and cost efficiency, particularly when countries impose import quotas or duties to favor domestic manufacturing.<sup>34,35</sup> The Indonesian government, for instance, has implemented import duty and luxury tax exemptions for electric vehicles produced by companies localizing part of their production.

As companies cater to growing domestic market demand, large emerging Asian economies that boast growing consumption potential such as India, Indonesia, Bangladesh, and the Philippines are also well-placed to increase their shares of global manufacturing (Figure 5).

At the same time, supply chains are evolving in response to export restrictions, such as controls on technology components, or local processing requirements such as Indonesia's requirement to process nickel locally before re-exporting it.<sup>36,37</sup> Index results reveal that Malaysia, the Philippines, Laos, Cambodia, Thailand, and Vietnam have practiced greater trade openness (Figure 6), with lower tariff- and non-tariff barriers, and proactive efforts to take part in various trade agreements. Several economies classified as Least Developed Countries (LDCs) have high scores for trade openness in our Index, as they have benefitted from preferential schemes such as the Generalized System of Preferences (GSP) or the EU's Everything But Arms (EBA) system, which allow tariff- and quota-free imports from LDCs. Relying on these schemes for export competitiveness is risky, as the schemes can change. These countries therefore need to develop their competitive strengths by making improvements in areas related to labor quality, digital readiness, and sustainability.<sup>38</sup>

### Recommendations:

**Remove Barriers to Trade:** Support integration into global production networks and regional trade agreements. Resist the temptation to impose tariffs, quotas, and import restrictions that protect domestic manufacturers and their export competitiveness, as these create barriers to participating in international



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trade, invite retaliatory measures, increase local manufacturing costs, and ultimately erode consumer welfare.

**Address High Trade Costs:** Reduce trade costs through enhancing infrastructure, simplifying customs procedures, harmonizing import and export requirements, and promoting regional integration. The Philippines, for instance, has high trade costs that impede its export potential.

**Diversify Exports:** Diversify markets for exporting goods, as well as export product mix, to grow participation in trade and reduce supply chain and regulatory risks. Economies like Bangladesh, for instance, must increase export diversity to ensure longer-term growth.

**Increase Utilization of Trade Agreements:** Increase training and information sharing to enable small- and medium-sized enterprises (SMEs) to take better advantage of trade agreements. Reduce administrative burden and costs associated with utilizing trade agreements.

**Foster Innovation and Entrepreneurship:** Entrepreneurial activity helps to drive growth, job creation, and consumer spending. Consider providing incentives or grants for innovative businesses. Transparent and fair regulatory frameworks also encourage investment and risk-taking.

## Environmental Sustainability and Worker Protection Increasingly Influence Trade Landscape

Rising climate change, resource scarcity, and economic inequality are spurring stricter environmental and social protection regulations globally. The year 2023 saw the emergence of multiple regulations that are set to elevate the due diligence and reporting obligations of Asian manufacturers, whether these are exporting to leading Asian markets or the West. Notably, the EU's Corporate Sustainability Due Diligence Directive, pending European Parliament approval, mandates comprehensive environmental and human rights reporting for companies operating in the EU. Companies will be required to report on the sustainability impacts, risks, and opportunities identified in their direct operations and upstream value chains. This will affect their Asian suppliers who will be asked to report on various sustainability elements and beyond, including their greenhouse gas emissions, impact on natural resources and the environment, and broader social impact of their activities. Obligations will be phased in through 2028, with reasonable assurance requirements starting after that.

Additionally, the EU's Deforestation Regulation will require that the manufacturers of products potentially associated with deforestation carry out in-depth due diligence and quality controls with their suppliers to guarantee products are deforestation-free if sold in the EU.

Other sector-specific disclosure requirements are under development in the EU, covering sectors such as textiles, batteries, information technology, electronics, pharmaceuticals, and biotechnology. Disclosure mandates and discussions on banning products linked to forced labor are also emerging in Europe, the U.K., the U.S., Canada, Australia, and Japan, affecting multiple industries.

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While avoidance might seem an option, similar regulations are emerging worldwide, including across Asia, pushing Asian manufacturers toward inevitable sustainability and labor practices reform. For instance, in Asia, numerous jurisdictions are legislating to integrate the climate disclosure framework developed by the International Sustainability Standard Board (ISSB) into their corporate reporting. The Shanghai, Shenzhen, and Beijing Stock Exchanges have issued draft mandatory sustainability reporting guidelines under which listed companies will be required to disclose information on the climate, biodiversity, and ecosystem impacts of their supply chains, and a fairly extensive list of additional topics.

Moving forward, the ability of Asian manufacturers to comply with sustainability standards and regulatory requirements could have a significant bearing on their ability to participate in global supply chains in a growth-enhancing way.

Our Index sustainability readiness rankings shown in Figure 7 (environmental sustainability performance) and Figure 8 (worker protection) highlight frontrunners in sustainability. It should be noted that countries in our Index have made good progress overall in expanding their renewable energy capacity. Notably, countries in the Greater Mekong Subregion (GMS) have been cooperating on renewable energy projects, with China, Thailand, and Vietnam financing hydropower projects in Laos and Cambodia that serve the GMS region. Bangladesh is a notable exception with a very low renewable energy capacity, but the International Finance Corporation has financed the installation of solar panels on most textile factories. Despite these achievements, most countries in our Index are not ready to comply with upcoming regulatory requirements. They lack reliable carbon data repositories and remain weak on worker protection standards.

### **Environmental Sustainability Recommendations:**

**Boost Clean Energy Transition:** Enhance access to low-cost, reliable clean energy to increase competitiveness, and also aid manufacturers affected by recent energy cost surges.

**Develop Carbon Markets:** Create emissions trading systems and provide access to carbon certificates to support renewable energy projects and help Asian manufacturers prepare for upcoming carbon border adjustment taxes. While the EU mechanism is focused on carbon-intensive manufacturing, legislative proposals under discussion in the EU, U.K., and U.S. to protect the competitiveness of domestic producers investing in costly carbon-reduction plans could potentially affect a much greater range of Asian manufacturers.

**Implement Green Transportation:** Upgrade transport networks and vehicles used for transporting materials and goods, and localize certain production processes to lower trade costs and reduce freight-related emissions.

**Enhance Environmental and Social Compliance:** Build the capacity of Asian manufacturers to comply with upcoming due diligence and reporting standards through improved training. Fast-track the development of carbon data repositories to facilitate disclosures.

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### **Improve Technology Use and Support Transition to Cleaner**

**Manufacturing:** Support manufacturers that digitize and install resource-efficient technologies, particularly those that must meet more stringent traceability, disclosure, and environmental standards, such as the EU’s push for “durable, repairable, and recyclable” textile products made from recycled fibers by 2030.

### **Worker Protection Recommendations:**

**Enforce Workers' Rights:** Strengthen labor laws and enforcement to protect workers' rights, including collective bargaining, especially in light of the prevalence of child labor in sectors like textiles, and the erosion of rights due to COVID-19.<sup>39,40,41</sup> Training on international standards and local codes of conduct, as well as capacity building, assessment, and certification of local suppliers to ensure standards are met, will become more crucial.

**Improve Working Conditions:** Address labor exploitation by ensuring safe working environments, decent conditions, and living wages. This is essential as protests and rising living costs highlight the need for fairer compensation and better safety standards.

**Close Participation Gaps:** Tackle increased workforce participation disparities, particularly among women and youth, exacerbated during the pandemic. Develop targeted policies, incentives, and training to promote inclusivity and disclose diversity, equity, and inclusion efforts.<sup>42</sup>

## CASE STUDY

### H&M Uses Data to Spearhead Sustainability

H&M’s sustainability strategy aims to not only reduce greenhouse gas emissions and support worker rights, but also to encourage a shift toward circular business models within the fashion sector.

A significant part of H&M's sustainability efforts revolves around the use of data and technology. The company has started using artificial intelligence and technology innovation to become more data-driven. It is creating algorithms for online product recommendations. This use of AI and machine learning plays a crucial role in reducing returns and minimizing emissions from transportation.

H&M is also exploring circularity initiatives, such as the “Loop”, a garment recycling machine installed in some H&M stores that can be used by customers to upcycle their old clothes into something new, onsite.<sup>43</sup> H&M is also making investments in material innovation companies like Renewcell, which develops new materials from recycled cotton. These efforts, coupled with embedding technology into products to facilitate circular customer journeys such as reselling, renting, and repairing clothing items, are also part of H&M's sustainability efforts.<sup>44,45,46</sup>

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# Conclusion

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The movement of products through extensive supply chains persists, even as globalization, once regarded as an unquestioned force of progress, now finds itself under increased scrutiny. The drive for more resilient and faster supply processes, coupled with the changing trade dynamics between the U.S. and China, is creating new trading patterns and opportunities. While there has been little shift toward bringing manufacturing back home, the ongoing diversification in trade opens up numerous prospects for emerging Asian economies to amplify their presence in both global and regional markets. The rise of trade among developing countries also presents new growth paths.

However, the competitive landscape among manufacturers is getting tougher. Trade is becoming more concentrated, and China not only remains an important hub in the supply chain, but it is also gaining an edge in advanced and green technologies, owing to deepening innovative capacity and government support.

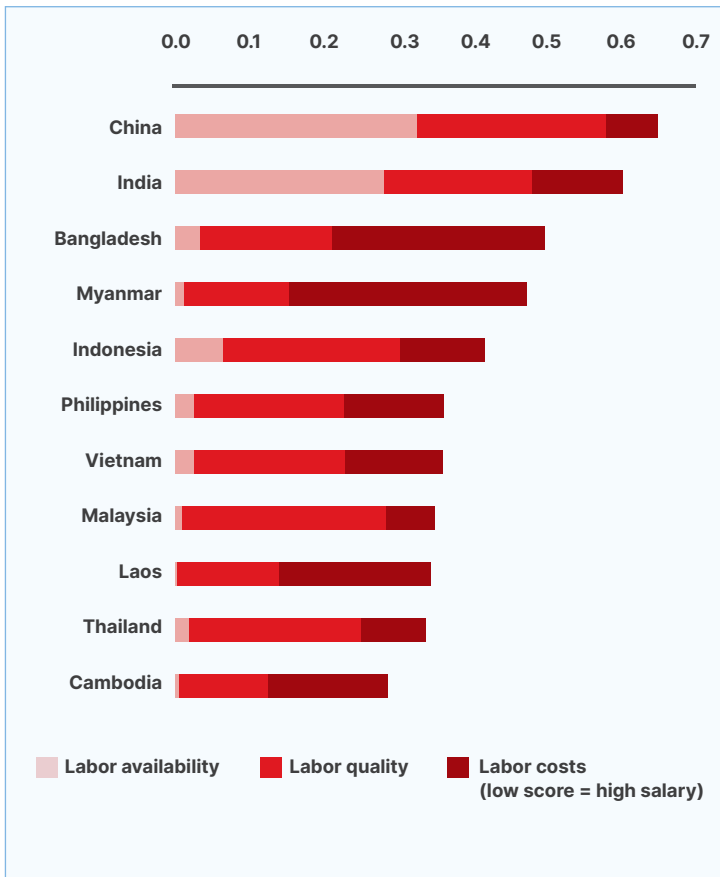
While this overview concentrates on the trade of goods, it is important to highlight that service trade, especially digital, is emerging as an equally, if not more, significant sector for growth.

For emerging Asian countries to fully realize their trading capabilities and become compelling “China-plus” locations for supply chains of the future, they must leverage their strengths effectively. Large consumer markets and workforces are clear advantages. Yet, to stand out, they need to focus on improving labor quality, embracing digital technologies, prioritizing sustainability and worker protection, and fostering innovation. Doing so will build their competitive edge in a new and evolving world of trade.

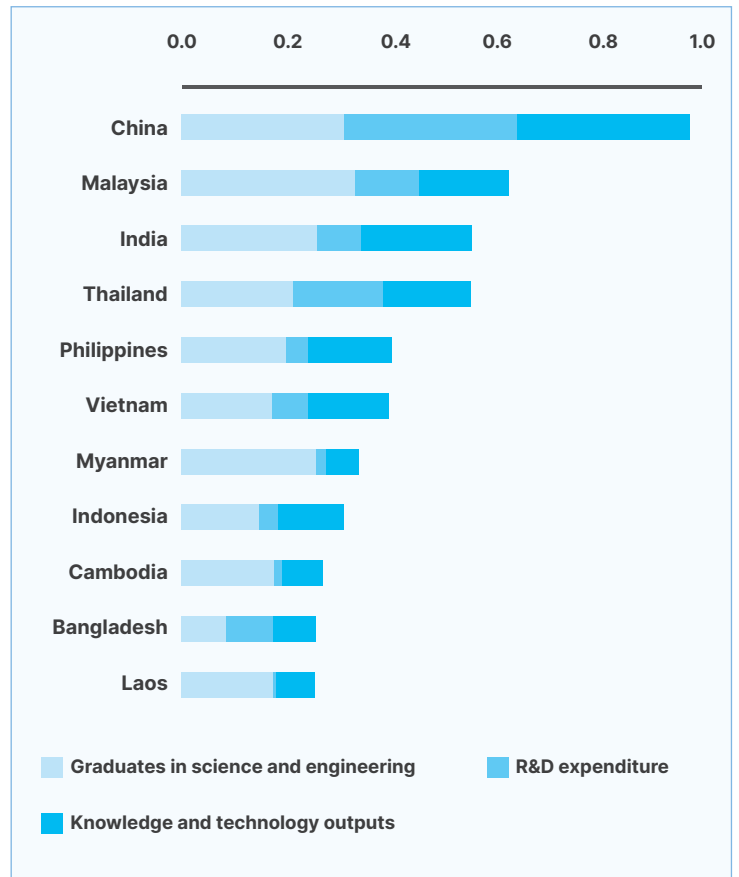
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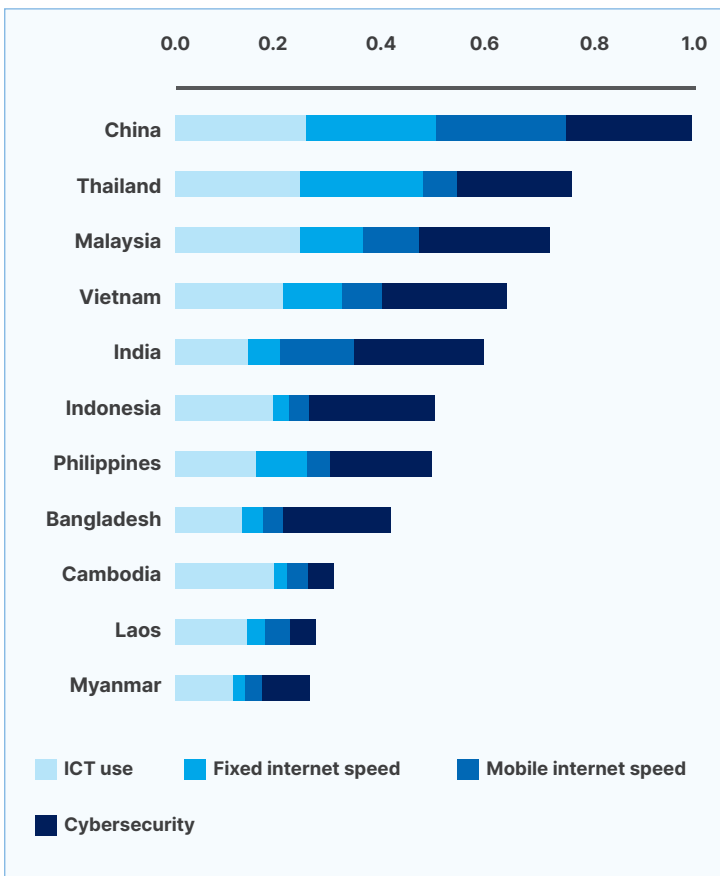
# Appendix 1: Sub-Index Scores



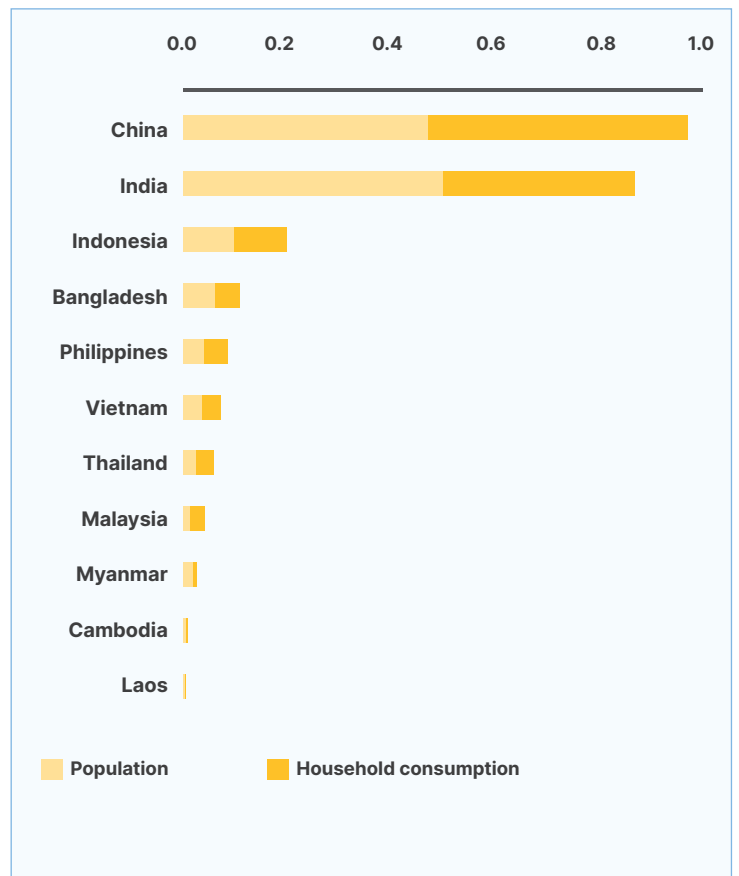
**FIGURE 2**  
LABOR SUB-INDEX



**FIGURE 3**  
CAPACITY FOR INNOVATION SUB-INDEX

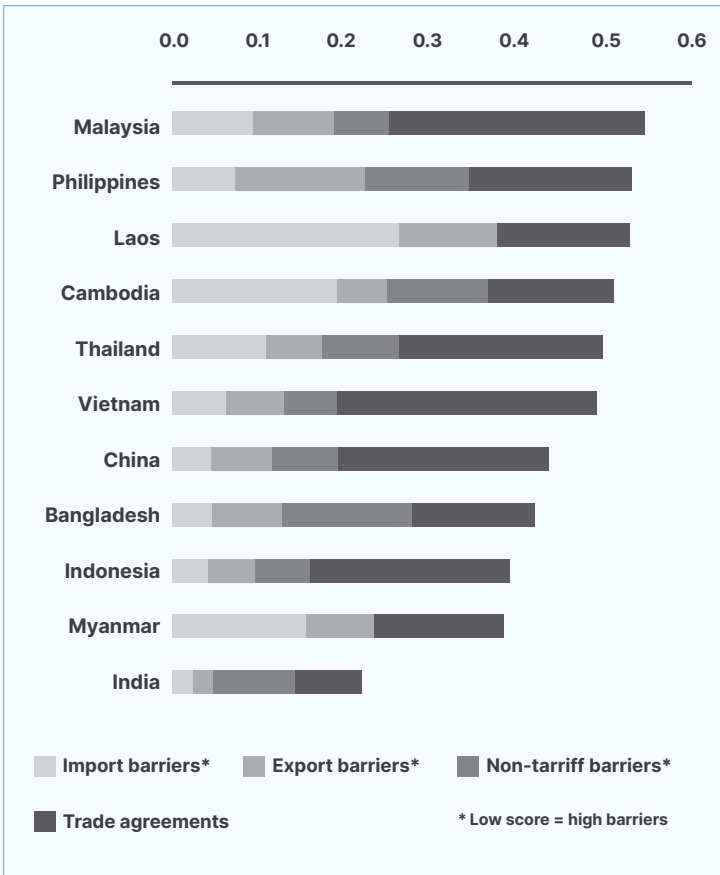


**FIGURE 4**  
DIGITAL READINESS SUB-INDEX

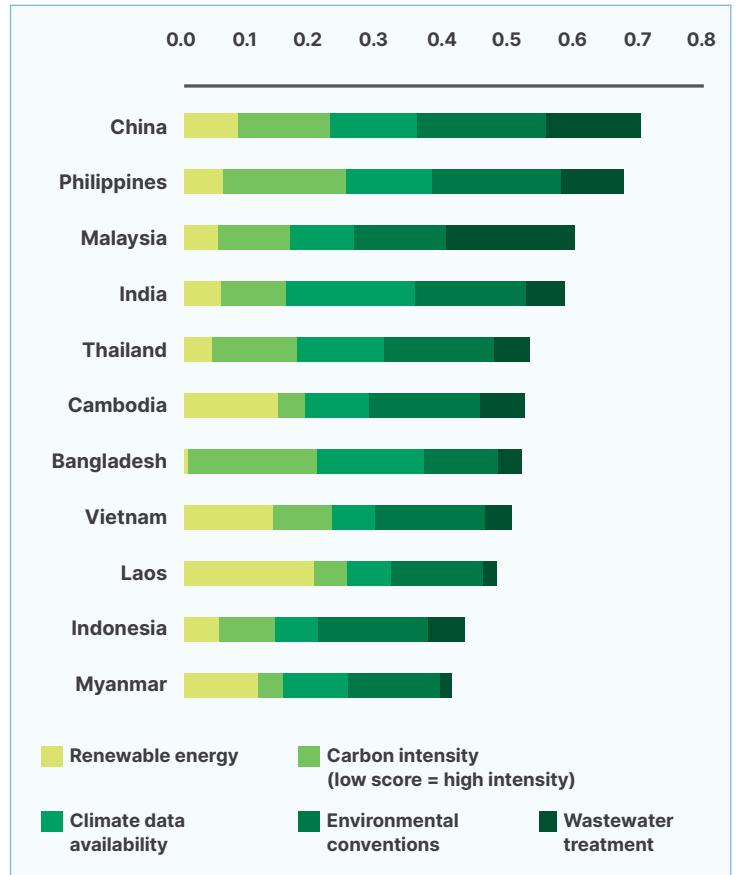


**FIGURE 5**  
MARKET POTENTIAL SUB-INDEX

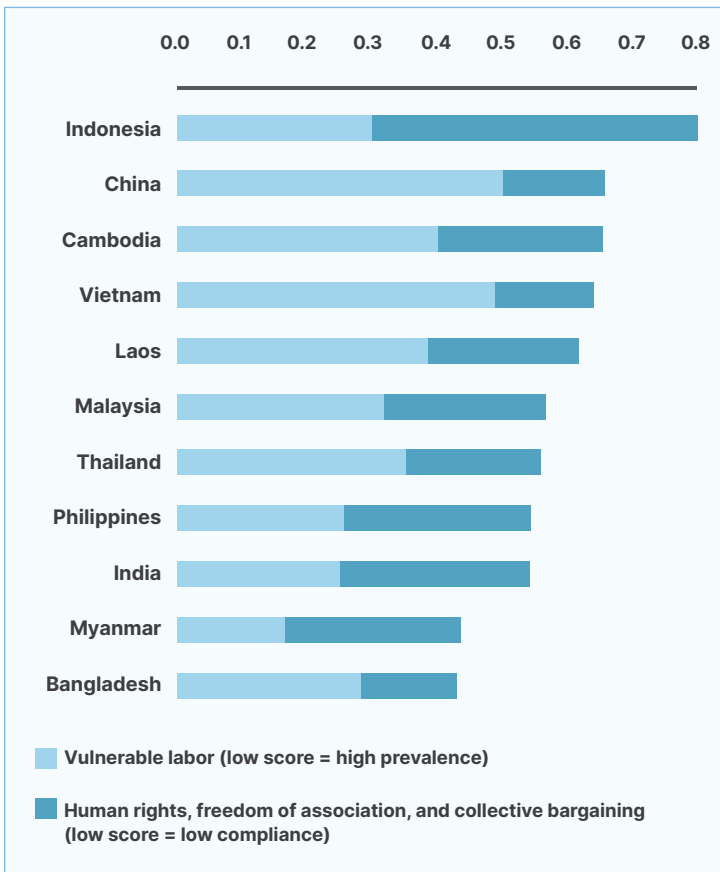




**FIGURE 6**  
TRADE OPENNESS SUB-INDEX



**FIGURE 7**  
ENVIRONMENTAL SUSTAINABILITY SUB-INDEX



**FIGURE 8**  
WORKER PROTECTION SUB-INDEX

## Appendix 2: Asia Manufacturing Diversification Index: Country-by-Country Summary

**China** remains in the lead for manufacturing overall, and is poised for continued growth despite rising wages and a shrinking labor force. With robust economic fundamentals, it excels in nearly all aspects of the Council's Index, except trade openness where it trails slightly behind Malaysia. Its large, skilled labor force and central role in global value chains afford it a competitive edge, alongside its massive consumer market and export-focused manufacturing hubs that have contributed to significant economies of scale and productivity. Looking ahead, China's innovation capacity, digital readiness, and performance in environmental sustainability are key advantages. The government also aims to maintain the country's manufacturing dominance by promoting intelligent and green manufacturing and technology integration. December 2023 saw government guidelines for upgrading manufacturing, focusing on strengthening digitization and production networks. Furthermore, China's dominance in critical minerals supply chains for electronics, electric vehicles (EVs), and green technologies, along with its control over the battery value chain, reinforces its competitive position.

**India** ranks second in the Index, with factors that favor both labor-intensive and technology-driven sectors. It has attracted mainly domestically focused manufacturers while looking to grow its appeal to exporters. Existing challenges that hinder its export ambitions include limited trade openness, moderate digital readiness, and weak worker protection. Government policies aiming to boost the economy through simultaneously availing incentives and implementing tariffs to protect domestic manufacturers have increased export costs and strained trade relations, keeping India's global export share below 2% in 2022. Nevertheless, efforts to enhance India's role in tech value chains, especially in high-precision semiconductors and IT hardware, are underway. India's strong innovation capacity is a key asset in these endeavors.<sup>47,48,49</sup>

**Malaysia** positions third in the Index, closely trailing India but excelling in overall digital readiness, trade openness, and environmental sustainability. It stands out with good basic education and leading productivity, a high proportion of science and engineering graduates, strong innovation capacity, and high digital readiness. Malaysia's pivotal role in the global semiconductor supply chain, providing 20% of the U.S.'s semiconductor imports annually, surpassing Taiwan, Japan, and South Korea, underscores its tech competitiveness.<sup>50</sup> However, to boost exports, Malaysia needs to further improve tertiary education graduation rates and its digital infrastructure for industries of the future. While Malaysia demonstrates a strong commitment to environmental sustainability and efforts to align local disclosures with the International Sustainability Standards Board's (ISSB) new international benchmark, its relatively low worker rights score poses challenges, especially given new international disclosure and due diligence requirements.

**Thailand** ranks fourth in the Index, closely following Malaysia. It stands out for its high tertiary education graduation rates, R&D spending, and digital readiness, which could help increase the country's technology manufacturing appeal. The government is working to leverage Thailand's strategic location in Southeast Asia

to improve competitiveness, though infrastructure still needs to be upgraded. Initiatives include the Eastern Economic Corridor for logistics and high-tech industries, a Thai-Chinese high-speed railway to integrate more with Chinese value chains, and significant investment in deep-sea ports and a "land bridge" to connect East Asia with India and the Middle East. These efforts aim to counteract an aging workforce and address lower labor productivity and less-competitive labor costs relative to neighboring Vietnam and Indonesia.

**Vietnam** ranks fifth in the Index, with its future in tech showing great promise due to rapid automation and the development of integrated manufacturing ecosystems reminiscent of China's initial strides in this area. These ecosystems foster innovation and cost-efficiency across various industries. With tech parks and industrial zones like the Vietnam-Singapore Industrial Park and the Saigon High Tech Park, Vietnam is advancing toward high-value, digitally leveraged manufacturing.<sup>51,52</sup> The country's innovation capacity, digital readiness, and efficient workforce, along with improved labor laws from international trade agreements such as the EU-Vietnam Free Trade Agreement and the CPTPP, enhance its global economic integration. While Vietnam's labor-intensive sectors are nearing capacity, its productivity, strategic digitization, and proximity to China maintain its attractiveness. This shift toward digitization is improving productivity and sustainability in sectors like fast fashion. At the same time, manufacturing capacity constraints are nudging Vietnam toward higher-end production.

**The Philippines** is sixth in the Index, reflecting its expanding consumer market, strong trade openness and relatively promising score on sustainability measures driven by low carbon intensity, and high participation in environmental conventions. The country has significant geothermal and solar energy potential, and the government has taken steps to transition to increase the share of renewables in the overall power generation mix, although this is still work in progress. The Philippines also has a relatively strong capacity for innovation which supports a tech-intensive export mix. However, the country's poor infrastructure quality and elevated trade costs still limit its attractiveness for export manufacturing. Moreover, the absence of integrated manufacturing ecosystems, compared to alternatives like Indonesia and Vietnam, is leading investors to prefer these other neighboring locations.

**Indonesia** holds a mid-range position in the rankings, placing seventh with a score close to that of Vietnam and the Philippines. The country aims to draw more capital-intensive manufacturing investments through policies such as the requirement to process nickel domestically. This protectionist measure has attracted significant foreign investment, especially from China under the Belt and Road Initiative, and led to the creation of nickel processing manufacturing hubs.<sup>53</sup> The strategy, which the government aims to replicate in other sectors including coal, minerals, batteries, and agriculture, is to transition Indonesia into a value-added exporter. The government is also pushing for investments in commodities processing and green technologies from global players, including the U.S. and EU. Chinese investors are also adopting a strategic approach to develop comprehensive manufacturing ecosystems in the country. The current administration's efforts, expected to continue under the new government, focus on upstream processing in various sectors to attract international manufacturing, especially for consumer

goods and textiles. Still, challenges including underdeveloped infrastructure, less-competitive wage levels, low digital readiness, a less-skilled workforce, high trade costs, and environmental sustainability challenges need to be overcome, to increase Indonesia's appeal to export-oriented manufacturers.

**Bangladesh** stands out as a low-cost economy brimming with potential, distinguished by its rising labor quality, competitive labor costs, and digital readiness relative to other low-cost nations. In the textile sector, Bangladesh has established a comprehensive manufacturing ecosystem, now expanding into the production of fabric and yarn. The nation's shift toward innovative, more sustainable, and cleaner production techniques is yielding economic benefits.<sup>54</sup> Bangladesh's adoption of solar energy in textile factories nationwide to reduce dependence on energy imports, supported by investments from the International Finance Corporation (IFC), also curbed energy costs. Despite these advancements, the country faces challenges including concerns over worker protection and political stability. Bangladesh's ranking as the "worst country for workers in 2022" by the ITUC's Global Rights Index signals potential obstacles, especially as Western countries intensify regulations around human rights disclosures and products made with forced labor. Most of Bangladesh's manufacturing remains carbon-intensive due to a low percentage of renewables in the country's energy mix.

**Other least developed economies (LDCs) including Laos, Cambodia, and Myanmar** are grappling with various challenges. Their share in global exports has either declined or remained stagnant despite export volumes rising. Access to competitively priced components remains a challenge, which diminishes their cost advantage. Importantly, these LDCs have been relying on preferential schemes such as the Generalized System of Preferences (GSP) or the EU's Everything But Arms (EBA), which allow tariff- and quota-free exports to major economies for their export competitiveness, but the permanence of these schemes is not guaranteed. Moreover, a growing portion of exports are subject to non-tariff barriers, such as strict import licensing or subsidies to protect manufacturers in import markets. These barriers in turn undermine the effects of GSP and EBA preferences.<sup>55</sup> Areas for improvement that these countries can focus on include improving labor quality, productivity, digital readiness, as well as catching up to impending environmental and social requirements that will play a crucial role in determining future export competitiveness.

**Laos and Cambodia** are further constrained by their digital and technological gaps and low labor quality, though both are front runners in renewable energy. Myanmar has seen its potential in labor-intensive sectors and innovation decline due to political instability and human rights concerns.

## Appendix 3: Index Indicator Description and Data Sources

The Asia Business Council Asia Manufacturing Diversification Index measures the readiness of ten Asian economies, plus China, to grow their participation in international trade in goods and global value chains. The Index is intended to be a valuable benchmarking tool for policymakers and business leaders to assess the progress of different economies in manufacturing competitiveness. The overall Index ranking is based on seven sub-indices that have been assigned equal importance in presenting a complete picture of manufacturing attractiveness in a world of trade increasingly shaped by diversification considerations. Indicator values within each sub-index are normalized from 0 to 1 and assigned weightings based on perceived importance. For transparency and comparability, the Index only uses indicators with no missing data.

### Labor Sub-Index Indicators and Scores (Figure 2)

Indicator	Indicator description	Weighting	Data Sources
<b>Labor availability</b>			
Labor force size	People of working age 15-64 who participated in the labor force in 2022.	75%	Estimated by the Asia Business Council using data from the United Nations Department of Economic and Social Affairs on the working age population aged 15-64 in 2022 (World Population Prospects 2022), and data from the International Labour Organization (ILO) on the labor force participation rates for people aged 15-64 in 2022 (ILO Modelled Estimates – ILOEST – last updated December 2023).
Working population	Projected size of the population (both sexes combined) aged 15-64 in 2028. This estimate uses a constant-fertility variant, 2022-2100.	25%	Same as above.
<b>Labor quality</b>			
Mean years of schooling	Mean years of schooling for adults aged 25 years and older in 2021.	25%	UNDP Human Development Index 2023.
Tertiary education levels	Gross graduation ratio from first degree programs in tertiary education, both sexes (%) in 2023. Includes bachelor's and master's degree programs or equivalent, as per International Standard Classification of Education.	25%	OECD Education at a Glance 2023, using national sources, and UNESCO Institute for Statistics (UIS).
English proficiency	English proficiency levels, established based on test data from more than 2.2 million test takers around the world who took the EF Standard English Test (EF SET) in 2022.	25%	English First English Proficiency Index 2023.
Labor productivity	Total volume of output measured in terms of Gross Domestic Product produced per number of hours worked in 2023. GDP uses constant 2017 US dollar at purchasing power parity (PPP).	25%	ILO ILOSTAT database.
<b>Labor costs</b>			
Worker salary	Manufacturing worker average annual salary in 2023. Includes annual base salary, benefits, social security, overtime allowances, and bonuses. Manufacturing workers are general workers with three years of work experience, not including contract-based and probationary workers. Index scores invert salary data. Low score = high salary.	33%	JETRO Survey on Business Conditions of Japanese-Affiliated Companies. FY2023 (Asia and Oceania), published November 2023.



Engineer salary	Manufacturing engineer average annual salary in 2023. Salary uses the same definition as above. Manufacturing engineers are employees who are core technicians, graduates of a vocational college or university, and have 5 years of experience. Index scores invert salary data. Low score = high salary.	33%	Same as above.
Manager salary	Manufacturing manager average annual salary in 2023. Salary uses the same definition as above. Manufacturing managers are employees who are section managers, university graduates, and who have 10 years of work experience. Index scores inverts salary data. Low score = high salary.	33%	Same as above.

### Capacity for Innovation Sub-Index Indicators and Scores (Figure 3)

Indicator	Indicator description	Weighting	Data Sources
Graduates in science and engineering	Percentage of tertiary graduates in science and engineering in 2020. Data for China comes from national sources.	33%	UNESCO Institute for Statistics (UIS) online database, and OECD, Education at a Glance.
R&D expenditures	Total financial resources (national and foreign) used for the execution of research and experimental development (R&D) works on the national territory by the public and private sector in 2021. Includes annual wages and salaries of R&D personnel and operating expenses, and purchases of equipment required for R&D.	33%	UIS online database, OECD, Main Science and Technology Indicators (MSTI) database, and national data.
Knowledge and technology outputs	Composite score based on information on the number of resident patent and utility model applications filed at a given national or regional patent office in 2021, the number of international patent applications filed through the WIPO-administered Patent Cooperation Treaty, the number of articles published in the fields of science and technology in 2022, and the number of articles that have received at least H citations in 2022.	33%	World Intellectual Property Organization (WIPO) Global Innovation Index 2023.

### Digital Readiness Sub-Index Indicators and Scores (Figure 4)

Indicator	Indicator description	Weighting	Data Sources
ICT use	Composite score that assigns equal weight to the percentage of individuals using the internet, fixed broadband internet subscriptions per 100 inhabitants, active mobile broadband subscriptions per 100 inhabitants, and mobile broadband internet traffic (gigabytes/ subscriptions). Data is from 2021.	25%	WIPO Global Innovation Index 2023.
Fixed internet speed	Average fixed internet speed in Mbps in November 2023 defined as data transfer rates for internet access by end users. Values are a weighted average of three internet speed tests by Ookla, M-Lab, and SpeedTestNet.io.	25%	Speedtest Global Index, Median Country Speeds, November 2023.
Mobile internet speed	Average country mobile internet speed in Mbps in February 2024 defined as data transfer rates for internet access by end users. Values are a weighted average of three internet speed tests by Ookla, M-Lab, SpeedTestNet.io.	25%	Speedtest Global Index, Median Country Speeds, February 2024.
Cybersecurity	Scores countries based on their commitments to and progress in responding to cybersecurity challenges.	25%	International Telecommunication Union (ITU) Global Cybersecurity Index 2020.

## Market Potential Sub-Index Indicators and Scores (Figure 5)

Indicator	Indicator description	Weighting	Data Sources
Population	Total population in 2028 estimated from the latest available population data gathered by the IMF through national census data. Data mostly originates from 2023 census data.	50%	International Monetary Fund (IMF), World Economic Outlook database: October 2023.
Household consumption	Private consumption in 2028. Household final consumption expenditure is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. These are expressed in current international dollars converted by a PPP conversion factor to eliminate the effects of the differences in price levels between countries.	50%	Estimated by the Asia Business Council using data from the World Bank on household final consumption expenditure in 2022 (World Bank Data), and GDP and population estimates from the IMF for 2022 and 2028 (IMF World Economic Outlook database: October 2023).

## Openness to Trade Sub-Index Indicators and Scores (Figure 6)

Indicator	Indicator description	Weighting	Data Sources
Import barriers	Composite score that assigns equal weight to the the import share covered by trade distorting tariffs (2019-2021) average tariffs effectively applied by countries on their imports in 2021. Data for India is from 2018. Scores are calculated by inverting tariff rates. Low score = high tariffs.	30%	Global Trade Alert database, UNESCAP Country Trade and Investment Briefs 2022, and UNCTAD TRAINS database.
Export barriers	Average tariffs effectively faced by countries in 2021 when they export. Scores are calculated by inverting tariff rates. Low score = high tariffs.	15%	Same as above.
Non-tariff barriers	Share of imports potentially affected by 'harmful' non-tariff measures in force (up to 2018). Scores are calculated by inverting rates. Low score = high non-tariff barriers.	15%	Hinrich-IMD Sustainable Trade Index 2022 and Global Trade Alert.
Trade agreements	<p>Composite score that gives equal weight to regional trade agreements signed and under negotiation, and to supra-regional trade agreements in place, including CPTPP and trade agreements with the EU, U.S. (including trade agreements and TIFA agreements).</p> <p>Signed regional trade agreements weigh 50% more than agreements under negotiation. For supra-regional agreements, signed agreements are scored as 1, agreements under negotiation are scored as 0.67, agreements under consideration are scored as 0.33 and no agreement is scored as 0.</p>	40%	UNESCAP Country Trade and Investment Briefs 2022, United States Trade Representative website, European Commission trade department website, and CPTPP secretariat.

## Environmental Sustainability Sub-Index Indicators and Scores (Figure 7)

Indicator	Indicator description	Weighting	Data Sources
Renewable energy	Percentage of renewable energy in country energy mix in 2022.	20%	Ember Yearly Electricity Data (2023), based on Ember European Electricity Review (2022) and Energy Institute Statistical Review of World Energy (2023).
Carbon intensity	Greenhouse gas (GHG) emissions in 2020, including emissions of the six major GHGs expressed in emissions per unit of GDP (CO2 emissions/million \$GDP).	20%	Climate Watch Historical GHG Emissions 2022.

Climate data availability	Accounts for the existence of data repositories on power sources in 2023 and also information sufficiency and transparency. The indicator helps evaluate the ease of access to climate data by local manufacturers, for the purpose of producing climate disclosures and evidence-based transition plans.	20%	Asia Data Transparency Report 2023.
Environmental conventions	Counts the number of environmental conventions ratified and implemented in 2024 from the following list: Hazardous Wastes, Prior Informed Consent for Hazardous Chemicals (Rotterdam), Prevention of Marine Pollution, Protection of the Ozone Layer (Vienna), Climate Change (Kyoto), International Trade in Endangered Species, International Timber Agreement.	20%	Hinrich-IMD Sustainable Trade Index 2022 data set.
Wastewater treatment	Percentage of domestic wastewater flows that are safely treated.	20%	WHO indicators.

## Worker Protection Sub-Index Indicators and Scores (Figure 8)

Indicator	Indicator description	Weighting	Data Sources
Vulnerable labor	Measures the prevalence of forced and indentured labor per thousand workers in 2021. Index scores invert the ILO scores. Low score = high prevalence.	50%	Global Slavery Index 2023. Estimates produced by the International Labour Organization (ILO), Walk Free, and the International Organization for Migration (IOM).
Human rights, freedom of association, and collective bargaining	Level of national compliance with SDG indicator 8.8.2 - fundamental labor rights (freedom of association and collective bargaining), scored from 0 to 10, with 0 indicating higher levels of compliance. The score is based on six ILO supervisory body textual sources and also on national legislation. Index scores invert the ILO scores. Low score = high prevalence.	50%	International Labour Organization (ILO) Labour Market-related SDG Indicators (ILOSDG) database.

# Endnotes

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