SERI SOCIAL & ECONOMIC RESEARCH INITIATIVE

DRIVING ASEAN UNITY

Malaysia's Vision for 2025

DRIVING ASEAN UNITY:
MALAYSIA'S VISION FOR 2025

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About Social & Economic Research Initiative (SERI) Malaysia:

SERI serves as a bridge between multiple stakeholders, including government bodies, the private sector, and policymakers. Our mission is to promote greater awareness of the issues affecting society, catalyse the execution of pragmatic and impactful solutions, and support stakeholders in their quest to grow a more dynamic and equitable future for everyone. SERI is dedicated to making a meaningful impact through research and collaboration.

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DRIVING ASEAN UNITY: MALAYSIA'S VISION FOR 2025

SOCIAL & ECONOMIC RESEARCH INITIATIVE

We take great pride in the forging ASEAN ahead as a major economic focus and fundamentals but it's not just economic empowerment. It's cultural vibrancy and empowerment.

Anwar Ibrahim
The Asian Renaissance, 1996

ACKNOWLEDGEMENTS

This white paper has been prepared by SERI, commissioned by US-ASEAN Business Council (USABC) to provide an in-depth analysis and recommendations in 6 sectors - Digital Economy, Talent Acquisition, Healthcare, Sustainability, and Energy Transition. The information contained herein is contributed by member companies from industries such as ICT, FMCG (Fast-Moving Consumer Goods), Healthcare, Travel & Tourism, and Energy, and is based on data and sources deemed reliable and accurate at the time of writing.

We extend our sincere gratitude to all individuals and organizations who contributed to the successful design and execution of this exploratory study. In particular, we acknowledge Rashaad Ali, managing director for SERI, for his dedicated efforts in conducting interviews and overall project management, the dedicated efforts of the ASEAN research team at SERI —, Claudia Ng, Vyshnavi Charrlotte, and Aliya Waheedah — for conducting the research and writing of this report. We also appreciate the contributions of Sara Rizal and Syafiqa Zakaria for their exceptional communication support and design.

This white paper is based on information current as of 24th March 2025.

Please contact Rashaad Ali (Managing Director, SERI) at rashaad@seri.my for questions, comments, or suggestions regarding the report.

FOREWORD

Tan Sri Nazir Razak
Chairman, ASEAN Business Advisory Council (ASEAN-BAC) Malaysia

As Malaysia assumes the ASEAN Chairmanship in 2025, we stand at a pivotal moment in our region's history. ASEAN has long been a driver of economic integration, resilience, and cooperation, and Malaysia has played a key role in shaping this trajectory. This Malaysia White Paper, a collaborative effort between the Social & Economic Research Initiative (SERI) and the US-ASEAN Business Council (US-ABC), presents an insightful and forward-thinking roadmap to accelerate ASEAN's progress in the face of an evolving global landscape.

ASEAN-BAC Malaysia's 2025 agenda is centered on strengthening regional economic integration, fostering digital transformation, enhancing workforce readiness, advancing sustainability, and accelerating energy transition—all of which align closely with the White Paper's five strategic priorities: Digital Economy, Talent Development, Healthcare, Sustainability, and Energy Transition.

The five strategic priority areas outlined reflect the urgent and transformative shifts ASEAN must embrace. Digital transformation is reshaping industries at an unprecedented pace, necessitating harmonized regulations and robust infrastructure to unlock ASEAN's full economic potential. Workforce development remains a critical pillar, ensuring that we equip our people with future-ready skills to compete in an increasingly knowledge-based economy. Healthcare and sustainability are equally pressing, requiring innovative solutions to enhance well-being while fostering responsible growth. Finally, the region's energy transition must be tackled with pragmatism and urgency to balance economic expansion with environmental responsibility.

As Chairman of ASEAN-BAC Malaysia, I am proud to support this initiative. The Malaysia White Paper provides not only an ambitious vision but also actionable recommendations that can guide our policymakers, businesses, and stakeholders toward a more resilient, inclusive, and sustainable ASEAN. Malaysia is committed to leveraging its leadership in ASEAN to foster deeper collaboration between the public and private sectors, ensuring that we collectively navigate the challenges and opportunities ahead.

I congratulate SERI and USABC for their invaluable contributions to this important discourse. Together, let us seize this moment to shape ASEAN's future and reinforce our region's position as a global leader in innovation, sustainability, and economic inclusivity.

FOREWORD

Amb. Ted Osius
President & CEO US-ASEAN Business Council

Malaysia finds itself at a defining moment as it takes a leadership role in the 2025 ASEAN Chairmanship amidst a world that is being reshaped by technological advancement, climate change, geopolitical complexities, and economic transformations. Against this backdrop, Malaysia is poised to strengthen regional unity, drive sustainable economic growth, and reinforce ASEAN's position as a cornerstone of global trade and investment.

Therefore, as part of our commitment to supporting the Malaysian government, The US-ASEAN Business Council (USABC) — representing more than 180 member companies operating in Southeast Asia — is proud to partner with Social & Economic Research Initiative (SERI) in presenting this white paper, "Driving ASEAN Unity: Malaysia's Vision for 2025." This white paper underscores five key priority areas of Malaysia's ASEAN chairmanship: digital economy, workforce development, healthcare, sustainability, and energy transition. Each section of this paper aims to highlight key topics and challenges and provide in-depth analysis, leading to concrete recommended actions. This paper also contains valuable input from USABC members and relevant stakeholders which ensures diversity of perspectives and allows this white paper to be used as a reference for future discussions with key stakeholders.

On behalf of the US-ASEAN Business Council, I would like to extend my appreciation to SERI for its dedication in developing the white paper and USABC members for supporting this initiative. I am confident this white paper will provide valuable input for Malaysia's ASEAN Chairmanship, assisting ASEAN Member States in achieving their economic priorities.

USABC has represented U.S. private sector interests in Southeast Asia for four decades. We promote mutually beneficial trade and investment opportunities between the United States and ASEAN member states. ASEAN remains a cornerstone of regional economic collaboration and integration, playing a crucial role in shaping Asia's trade and financial frameworks. As one of the world's most dynamic regions, USABC recognizes ASEAN's growing importance in the global value chain and stands ready to support Malaysia in leading ASEAN through the evolving regional and global dynamics.

Furthermore, USABC has been a key partner to the Malaysian government, facilitating business relationships, offering strategic trade and investment insights, and providing thought leadership through knowledge that multinational US companies bring from doing business globally. We are fully committed to working with the Malaysian government to support the delivery of its vision for ASEAN.

Together, we can support Malaysia's chairmanship to shape policies that will drive growth and prosperity for the Malaysian people and the people across ASEAN.

FOREWORD

Marc Mealy
Executive Vice President & Chief Policy Officer, US-ASEAN Business Council

As the 2025 ASEAN Chair, the Government of Malaysia, followed by the Philippines in 2026 and Singapore in 2027, is uniquely positioned to help initiate national and guide regional economic transformational processes in ASEAN which can be valuable to the efforts of nations to navigate a degree of uncertainty in the global trading system not seen since the 20thcentury. In a sense, the value of the recommendations contained in this document can be measured both in terms of substance and timing.

Malaysia and ASEAN are not strangers to the idea of adopting strategic approaches when formulating responses to meet the challenges of moments in history associated with global economic shocks. As history has shown, in such moments, there are challenges that must fundamentally be addressed, but also opportunities to strengthen the competitiveness of domestic ecosystems and regional economic frameworks.

Malaysia and ASEAN also recognize that for decades, there is no better example in the world of how mutually beneficial commercial and socioeconomic relationships can be developed than ASEAN's relationships with the US private sector. As the ASEAN Secretary General Dr. Kao Kim Hourn noted during his visit to Washington DC last year: "In ASEAN, our perception is that the American business community leads the American side of the US-ASEAN relationship."

It is an acknowledgement which the members of the USABC value, because it reflects the US business community's long-term commitment to ASEAN. This paper and collaboration with the ASEAN Chair government is a new effort by the Council but will now become an annual initiative for years to come.

This year, USABC and its member companies seek above all to engage with both ASEAN Member States and US Government agencies to understand and try to resolve tariff and other trade issues. At the same time, USABC member companies remain consistent in continuing to build more mutually beneficial trade and investment relationships in the ASEAN region, as they have done for over 40 years.

FOREWORD

Dr. Helmy Haja Mydin
Chairperson of SERI

As Malaysia assumes the ASEAN Chairmanship in 2025, the region stands at a critical juncture. The promise of economic integration, digital transformation, and sustainable development must now be matched with decisive action. The challenges facing ASEAN—ranging from digital fragmentation to workforce readiness, healthcare gaps, and climate vulnerabilities—demand forward-thinking solutions that balance political will with socio-economic imperatives.

At the Social & Economic Research Initiative (SERI), we believe that evidence-based policymaking is the foundation of progress. This white paper, developed in collaboration with the US-ASEAN Business Council (USABC), outlines key strategic priorities that Malaysia must champion to ensure ASEAN remains a competitive and resilient economic bloc. These include fostering a robust digital economy, investing in future-ready talent, enhancing healthcare accessibility, accelerating the sustainability agenda, and driving a just energy transition.

Malaysia has a unique opportunity to shape ASEAN's trajectory for the next decade. It must lead the charge in harmonizing digital governance, adopting a skills-based approach to workforce development, and navigating the complexities of the green transition—ensuring that economic growth does not come at the expense of inclusivity or sustainability.

This report is a call to action. It challenges policymakers, businesses, and regional leaders to move beyond rhetoric and drive meaningful change. As we look ahead, SERI remains committed to advocating for solutions that matter, breaking down barriers, and shaping a more just and prosperous ASEAN.

EXECUTIVE SUMMARY

In 2025, Malaysia assumes the ASEAN Chairmanship for the fifth time, following a decade since its last term in 2015. Malaysia has played a pivotal role in ASEAN since its inception on 8th August 1967, One of Malaysia's most significant contributions as ASEAN Chair was helping shape the “ASEAN 2025: Forging Ahead Together” blueprint, aimed at deepening cooperation and building an ASEAN Community.

The AEC (ASEAN Economic Community), was established with the region’s end goal being regional economic integration. It envisions ASEAN as a single market and product base, a highly competitive region, with equitable economic development, and fully integrated into the global economy.[1] The most recent AEC blueprint 2025 represents the goal of a deeper regional economic integration. It envisions ASEAN as:[2] 1) A unified market and production base; 2) A highly competitive economic region; 3) A space for equitable economic development; and 4) A fully integrated part of the global economy.

This white paper, a collaborative initiative between SERI and US-ASEAN Business Council (USABC), highlights five priorities area for Malaysia’s leadership:

Digital Economy | **Workforce Development** | **Healthcare** | **Sustainability** | **Energy Transition**

These recommendations represent vital growth opportunities that require focused attention and investment. The paper calls for Malaysia to seize the moment to shape ASEAN’s future, address emerging challenges, and harness opportunities that will define the region’s trajectory.

While continuing to support economic integration and political cooperation, ASEAN must also adapt quickly to emerging trends like AI, digital transformation, the green economy, fintech, cybersecurity, workforce upskilling, healthcare innovation, and digital tourism. The energy transition sector is another critical area requiring swift action to address rising energy demands and climate risks.

Ensuring inclusive socio-economic growth across ASEAN requires targeted policies that address disparities in digital access, workforce development, healthcare, and energy transition. The region must prioritize equitable workforce mobility through skills harmonization, upskilling programs, and competency-based hiring to support economic resilience. Healthcare accessibility remains a critical concern, with a need for robust infrastructure and policies that mitigate the rising burden of non-communicable diseases and healthcare inequities. Meanwhile, sustainability efforts, including circular economy initiatives and interoperable ESG reporting frameworks, are essential for balancing economic growth with environmental responsibility. As ASEAN advances its digital and energy transitions, policy frameworks must safeguard affordability, accessibility, and social equity to ensure that all segments of society benefit from regional economic progress.

01 ASEAN. (2020). Economic Community. Association of Southeast Asian Nations. https://asean.org/our-communities/economic-community/
02 Ibid

KEY TAKEAWAYS

DIGITAL ECONOMY

ASEAN's digital ecosystem is fragmented, with varying digitalization rates, inconsistent regulations, and legal gaps in cross-border data flows and payments, which hinder regional integration. Governments have promoted regional payment systems like QR codes and e-wallets but expanding these systems and ensuring widespread adoption remain challenging. Emerging technologies like AI and blockchain are generating vast amounts of data, but regulatory frameworks are struggling to keep up, limiting innovation. Cybersecurity threats are rising, particularly in digitalized countries like Singapore, Thailand, and Indonesia. Additionally, Southeast Asia's tourism sector struggles to shift to a "quality tourism" model focused on sustainability and high-value experiences, as digitalization and AI offer potential, but infrastructure gaps and regulatory diversity continue to pose significant barriers.

KEY ACTIONS

- **Develop a unified digital framework**
  Establish a region-wide regulatory framework that standardizes data governance, promotes mutual recognition of Cross-Border Privacy Rules (CBPR), and aligns with global standards for seamless cross-border payments.
- **Strengthen public-private collaboration**
  Create regional platforms for dialogue between governments, businesses, and financial institutions to co-develop digital policies, invest in cybersecurity infrastructure, and provide training programs for digital workforce development.
- **Enhance regional cybersecurity measures**
  mplement a joint ASEAN cybersecurity threat intelligence-sharing platform, create a dedicated cybercrime task force for cross-border investigations, and enforce harmonized cybersecurity policies across member states.
- **Advance digital inclusion and SME growth**
  Establish a regional digital skills certification program to facilitate talent mobility, implement e-commerce capacity-building programs for SMEs, and develop interoperable digital identity systems to streamline cross-border transactions.
- **Facilitating regional alignment on AI governance**
  Amplify the ASEAN Guides on AI Governance and Ethics, ensuring alignment with domestic AI governance approaches, as well as create a regional AI regulatory sandbox for testing innovations.
- **Digitize and modernize ASEAN's tourism industry**
  Launch a unified ASEAN digital tourism platform that integrates AI-driven personalized travel recommendations, digital payment solutions, and smart infrastructure to enhance visitor experience and sustainability.
- **Close the digital divide**
  Expand 5G and broadband connectivity in underserved regions, introduce digital literacy programs in rural communities, and establish affordable financing schemes to support technology adoption among low-income populations.

WORKFORCE DEVELOPMENT

The rapidly evolving job market, driven by the digital economy, green jobs, and advancements in artificial intelligence (AI), has highlighted significant skill gaps across ASEAN. Addressing these gaps through greater academia-industry collaboration as well as targeted reskilling and upskilling initiatives are critical to aligning the workforce with current market demands and enabling it to seize the opportunities presented by the future economy. Malaysia is uniquely positioned to emerge as a regional leader in talent development, with the potential to set a benchmark for ASEAN by fostering a skilled and adaptable workforce made up of well-trained school leavers, university graduates and postgraduates.

KEY ACTIONS

- **Adopt a systematic approach to skills mapping**
  Establish standardized competency assessments to align job roles with industry needs and streamline hiring practices.
- **Promote lifelong learning**
  Implement strategies to close gaps in fast-changing demands of the labor market.
- **Broaden the recognition of skills acquired**
  Allow organizations to tap into a more diverse talent pool through unconventional methods.
- **Enhance curriculum adaptability**
  Ensure universities align education with industry needs by adopting modular designs, industry collaborations, and work-integrated learning programs.
- **Facilitating regional alignment on AI governance**
  Amplify the ASEAN Guides on AI Governance and Ethics, ensuring alignment with domestic AI governance approaches, as well as create a regional AI regulatory sandbox for testing innovations.
- **Integrate practical learning**
  Equip students with industry-relevant skills through capstone projects, work-integrated learning programs, and the development of transferable skills.
- **Advance gender equity in STEM and emerging industries**
  Strengthen policies, promote inclusive education, and support women's participation in AI, green technologies, and STEM fields.

HEALTHCARE

Sustainable healthcare is increasingly vital for the (ASEAN) as its member states strive to improve health outcomes amid economic and demographic shifts. With a growing and ageing population, ASEAN faces escalating demands for healthcare services, necessitating robust and long-term solutions.[3] To address these challenges, ASEAN countries must explore diverse and innovative financing mechanisms that ensure both effectiveness and equity, bridging gaps in healthcare access and quality across the region. In addition, to effectively manage non-communicable diseases (NCDs), ASEAN should implement harm reduction strategies and promote healthy lifestyles through comprehensive policies and regional collaboration.

KEY ACTIONS

- **Establish a Balanced Regulatory Framework for Harm Reduction**
  Promote evidence-based policies and regional collaboration to support public health while fostering innovation.
- **Establish a Balanced Regulatory Framework for Nutritional Innovation**
  A holistic approach on nutritional policy is needed in ASEAN to advance science-driven policies and strengthen regional partnerships.
- **Develop a Comprehensive Framework for Safe Pharmaceutical Disposal**
  Advance sustainable drug disposal practices and protect public health and the environment.
- **Strengthen Digital Healthcare Frameworks in ASEAN**
  Advance equitable access, supply chain security, and outbreak management through innovative technologies and regional collaboration.

[03] Addressing the Challenges of Population Ageing in Asia and the Pacific IMPLEMENTATION OF THE MADRID INTERNATIONAL PLAN OF ACTION ON AGEING. (n.d.). https://asean.org/wp-content/uploads/2021/01/Addressing-the-Challenges-of-Population-Ageing-in-Asia-and-the-Pacific-2017.pdf

SUSTAINABILITY

ASEAN's rich natural resources are under pressure from rapid economic growth, causing deforestation, pollution, and unsustainable resource use. To ensure sustainable development, the region must adopt a circular economy to minimize waste, conserve resources, and promote sustainable business practices. Establishing a standardized sustainability framework can drive green technologies, investments, and innovation, creating a cleaner, greener, and more resilient ASEAN for the future.

KEY ACTIONS

- **Formalize an ASEAN Circular Economy Framework Agreement (CEFA)**
  Establish a circular economy framework to harmonize policies, facilitate trade, and promote cross-sector collaboration for sustainable growth and environmental protection across member states.
- **Foster regional adoption of Extended Producer Responsibility**
  Drive sustainable waste management through policy harmonization, trade facilitation, and circular economy principles.
- **Leverage technology for regional waste management**
  Foster cross-border collaboration through AI and blockchain innovations to enhance efficiency, transparency, and accountability.
- **Promote local material sourcing for economic growth and environmental sustainability**
  Strengthen local supply chains to boost regional economies while reducing environmental impact.
- **Implement integrated water resources management (IWRM) for sustainable water resource utilization**
  Promote coordinated efforts to address water management challenges while enhancing regional resilience to climate change.
- **Advance green infrastructure development for sustainable urban resilience**
  Integrate eco-friendly solutions to mitigate carbon emissions, and enhance urban livability across ASEAN.
- **Champion sustainable data centers for ASEAN's digital future**
  Enhance regulatory frameworks in ASEAN and incentivize supplies of renewable energy to support energy-efficient and eco-friendly data center operations.
- **Promote interoperable sustainability reporting for enhanced ESG alignment**
  Streamline reporting frameworks to improve consistency and reduce redundancies and support sustainable economic growth.
- **Facilitate phased Scope 3 emissions reporting for comprehensive sustainability practices**
  Gradually incorporate indirect emissions into sustainability frameworks to enhance the quality and consistency of Scope 3 emissions reporting.

ENERGY TRANSITION

ASEAN, the world's fourth-largest energy consumer with nearly 680 million people, faces rising energy demand, high energy costs, growing emissions, and climate vulnerabilities. A just energy transition, starting with power sector reforms, is essential. Supportive regulations can enable capacity building, green workforce training, and innovation to address climate risks while ensuring sustainable growth and maintaining the competitiveness of the ASEAN market.

KEY ACTIONS

- **Streamline licensing and improve the investment climate**
  Simplify licensing processes and establish investor-friendly legal frameworks to attract stakeholders.

- **Strengthen ASEAN partnerships for green energy integration and regional competitiveness**
  Strengthen ASEAN partnerships to streamline the flow of green energy and resources. Advance ASEAN as an energy bloc in order to reduce global dependency, reduce electricity prices, establish frameworks for cross-border electricity trading and recognition of Renewable Energy Certificates (RECs), to reduce competition between ASEAN member states, and increase competitiveness of the region relative to other geographies.

- **Promote community-level renewable microgrids for energy equity and local job creation**
  Foster initiatives like community-level renewable microgrids that can serve in remote regions, enhance energy equity and at the same time provide localized job opportunities.

- **Empower local graduates with skill-building programs for a competitive ASEAN energy sector**
  Empower local graduates with skill-building programs tailored for the energy sector, ensuring equitable growth and innovation. Harmonize standards across the region to encourage talent mobility. Focus on implementation of key actions rather than having more dialogue-based conferences.

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DIGITAL ECONOMY

KEY HIGHLIGHTS

- ASEAN's digital economy is projected to grow from US$ 300 billion to US$ 1 trillion by 2030, with the Digital Economy Framework Agreement (DEFA) expected to accelerate this growth. The Framework, set for conclusion in 2025, places Malaysia in a crucial leadership position as the 2025 ASEAN Chair to guide digital transformation discussions.

- The lack of harmonized regulations across ASEAN countries has led to fragmented digital policies, complicating cross-border data flows. Voluntary frameworks such as the ASEAN Model Contractual Clauses (MCCs) face challenges in implementation, as they are not mandatory and lack alignment with global data transfer mechanisms like the EU Standard Contractual Clauses (EUSCCs). Stricter data localization laws in countries like Vietnam further increase operational costs for businesses and discourage foreign investment.

- Cybercrime in Southeast Asia surged by 82% between 2021 and 2022, with increasing threats targeting digital economies in Singapore, Thailand, Indonesia, and Vietnam. The region faces ransomware attacks, phishing scams, and state-sponsored cyber intrusions—highlighting the need for stronger cybersecurity frameworks and cooperation among ASEAN nations. Additionally, state-linked cyber espionage activities threaten economic and national security.

- AI has the potential to boost ASEAN's GDP by up to 18%, contributing US$ 1 trillion by 2030. ASEAN introduced the ASEAN Guide on AI Governance and Ethics in 2024 to balance AI's economic potential with ethical considerations. However, AI adoption varies among ASEAN nations, with gaps in infrastructure, data governance, and regulatory clarity. Malaysia, as ASEAN Chair in 2025, can spearhead AI governance discussions, fostering responsible innovation.

- ASEAN's tourism industry is rebounding, with visitor arrivals increasing by up to 153% year-on-year in 2023. AI and digital platforms can enhance tourism experiences, drive sustainable travel, and mitigate overtourism issues. However, inconsistent digital infrastructure and technological adoption across ASEAN countries limit the sector's full potential. As 2025 ASEAN Chair, Malaysia can lead digital transformation initiatives to improve tourism resilience and sustainability.

1.1 BACKGROUND

ASEAN expects its digital economy to grow from US$300 billion to US$1 trillion by 2030[5]- member countries are looking to double this figure through the implementation of the Digital Economy Framework Agreement (DEFA). With negotiations that began at the end of 2023, ASEAN leaders aim to conclude the framework by 2025[6], which highlights the importance of Malaysia as the 2025 ASEAN chair to lead these discussions.

ASEAN is witnessing a digital transformation that varies across its ten member countries, but the region collectively shows significant progress. In 2023, the SEA digital economy delivered $100B in revenue, growing at 27% CAGR since 2021 – 1.7X the rate of gross merchandise value (GMV) growth. E-commerce, travel, transport, and media contributed $70B in revenue. Remarkably, the focus on monetization has not come at the expense of consumer engagement and GMV growth. GMV grew at 11% to $218B in 2023[7]. This growth is evidenced by the rapid expansion of e-commerce, digital payments, as well as a thriving start-up ecosystem.

Digital transformation supports ASEAN's regional integration goals by facilitating cross-border trade, enhancing connectivity, and aligning regulatory frameworks, fostering a unified and prosperous digital ecosystem. However, challenges such as a fragmented digital ecosystem, limited innovation, and increasing cybersecurity threats hinder progress, creating disparities across member states. Addressing these issues is crucial for achieving sustainable and inclusive digital integration in the region.

1.2 DIGITAL ECONOMY FRAMEWORK AGREEMENT (DEFA)

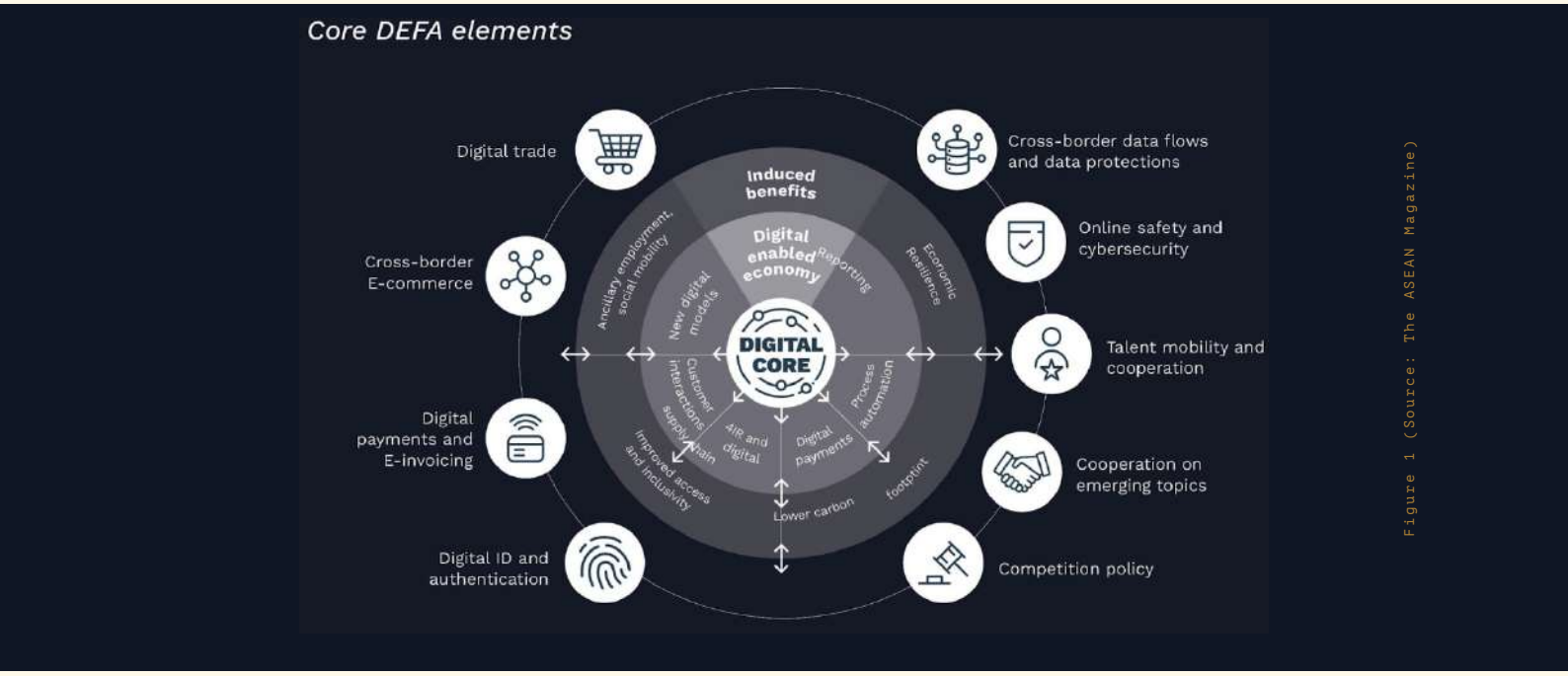


Figure 1 (Source: The ASEAN Magazine)

[5] Digital Economy Framework Agreement (DEFA): ASEAN to leap forward its digital economy and unlock US$2 Tn by 2030. (2023, August 19). Asean.org. https://tinyurl.com/5n98ymr2

[6] HSBC Business Go. (2025). Hsbc.com. https://tinyurl.com/ypfrjcfu

[7] Reaching new heights: Navigating the path to profitable growth. (n.d.). https://www.thinkwithgoogle.com/_qs/documents/18380/e_conomy_sea_2023_report.pdf

The structure of DEFA is a digital ecosystem that is interconnected and multi-layered[8]. At its center lies the digital core, to uplift foundational sectors such as hardware, software, services in telecommunications, IT, data and AI. This core serves as the driving force for the development of a digitally-enabled economy—the second layer of the ecosystem. This economy is built on the use of digitalization across various sectors, creating new digital business models like e-commerce, fintech, and agritech, as well as improving processes like customer interactions, payments, and operations. Beyond businesses, the digital ecosystem also brings induced benefits, such as better social mobility, a smaller carbon footprint, and stronger resilience in communities.

DEFA Has Nine Core Elements To Serve Four Main Aims:

01 Accelerating growth: Includes facilitation of digital trade and cross-border e-commerce.

02 Driving interoperability across the ASEAN region: This focuses on the interoperability of payments and e-invoicing systems and the use of Digital ID and electronic authentication.

03 Ensuring responsible growth: This aims to increase cooperation among ASEAN member nations in cybersecurity and data protection.

04 Strengthening cooperation among member nations: Deals with talent mobility, competition, and cooperation on emerging topics like artificial intelligence regulations.

1.3 CHALLENGES

1.3.1 Fragmented Digital Ecosystem

ASEAN countries and digitalization are progressing at different rates, which has led to varying rules and limited coordination across the region. This fragmentation makes it difficult for businesses to operate smoothly across borders and hinders the creation of a cohesive digital market. Many countries focus more on their national regulations than on regional cooperation, which leads to inconsistent standards and practices. Hence, these legal and structural gaps should be addressed in DEFA by the end of 2025.

A. Legal Gaps in Cross-Border Data Flows

New technologies like AI, blockchain, drones, IoT as well as machine-to-machine products and services that operate without human intervention, are constantly producing, storing, and analyzing an unprecedented amount of data.[9] These developments rely on access to and trade of high-quality data which span multiple countries, making cross-border data flows essential for driving digitalization.[10]

[08] Study on the ASEAN Digital Economy Framework Agreement. (n.d.-b). https://tinyurl.com/4y9rhfk9

[09] Building the foundations: the role of regional and international trade agreements Cross-Border Data Mechanisms Making Cross-Border Data Happen: Technical Components Connectivity Data Standards Data and system interoperability Data sandboxes Data portability Data tracing Data provenance Encryption Data registries and data exchange Cross-Border Data In Practice: Open Banking Concluding Thoughts 5. (n.d.). https://tinyurl.com/4zybsa4k

[10] Ibid

The ASEAN Framework on Personal Data Protection and the ASEAN Framework on Digital Data Governance guide efforts to enhance interoperability while safeguarding data privacy. Although regional frameworks like ASEAN Model Contractual Clauses (MCCs) are recognized for their potential to address challenges in cross-border data flows, various challenges remain.[11]

First, these frameworks provide only a basic level of data protection, which limits their effectiveness when trading with partners that have more advanced data protection standards. Second, their adoption is not mandatory, and businesses must still comply with additional requirements outlined in national laws. Third, **the MCCs are not yet compatible with the EU Standard Contractual Clauses (EUSCC) or other international mechanisms for data transfers.**[12]

Inconsistent implementation of these voluntary data protection frameworks across member states creates uncertainty and legal risks for businesses handling cross-border data. For example, in November 2024, Vietnam proposed a new data protection law that included stricter rules on keeping data within the country. This development has raised concerns among large, multinational technology firms, such as those from the U.S., as it may hinder operational efficiency, increase regulatory burdens, and potentially deter foreign investment in the country.[13]

B. Legal Gaps in Data Localization

Several ASEAN member states (AMS) have implemented policies that restrict the movement of data through stringent data localization requirements.[14] These restrictions can significantly hinder the development of ASEAN's digital economy, particularly affecting micro, small, and medium-sized enterprises (MSMEs). For many MSMEs, which often operate with limited flexibility and resources, such policies create barriers to accessing global networks and participating in digital trade.[15] Moreover, data localization requirements **can impose substantial financial burdens, increasing the cost of hosting data by 30–60%.**[16] This not only discourages MSMEs from investing in robust data security mechanisms but also stifles their ability to innovate and develop new products and services. Such restrictions ultimately jeopardize the competitiveness of ASEAN's digital economy and undermine its potential for growth.

The data localization policies implemented by many ASEAN member states are often justified as measures to safeguard national security. However, research indicates that restricting cross-border data flows—particularly in the financial sector—can have unintended negative consequences. These restrictions increase information technology (IT) and data complexity, **weaken risk management frameworks, and undermine the cybersecurity and anti-money laundering efforts of financial institutions.**[17] Data localization requirements also stifle innovation by imposing

[11] Liu, J., Sengstschmid, U., & Ge, Y. (2023). Facilitating Data Flows Across ASEAN: Challenges and Policy Directions. Social Science Research Network. https://tinyurl.com/3afsaw46
[12] Ibid.
[13] Guarascio, F., & Nguyen, P. (2024, November 5). US tech firms warn Vietnam's planned law to hamper data centers, social media. Reuters. https://tinyurl.com/33r9x32k
[14] Digital Trade Priorities for ASEAN, US-ABC Staff, 2022
[15] Ibid.
[16] Ibid.
[17] The Real National Security Concerns over Data Localization. (n.d.). https://tinyurl.com/2s44kwya

significant burdens on businesses and raising barriers to market entry, which poses a serious threat to ASEAN's long-term competitiveness. For the many companies that rely on seamless data flows to deliver goods and services across the region, these obstacles create significant operational challenges, jeopardizing their ability to thrive in an increasingly interconnected digital economy.

Data localization requirements play a particularly critical role in the healthcare sector, as cross-border data flows are essential for **advancing scientific research, fostering innovation, and enabling the discovery and evaluation of new treatments** across ASEAN member states. To address future unmet clinical needs and health emergencies, it is imperative to facilitate and support ongoing international research collaborations and seamless information exchange. By promoting a globally diverse research capacity, ASEAN can better position itself to tackle pressing health challenges and drive meaningful advancements in medical science.[18]

C. Structural Gaps in Cross-Border

A smooth and easy cross-border digital payment system can further grow the e-commerce market, creating new economic opportunities for Small and Medium Enterprises (SMEs), which make up 97–99% of businesses and account for 60–80% of jobs in ASEAN countries.[19]

ASEAN governments have encouraged the acceptance of regional payment methods, particularly Quick Response (QR) codes and e-wallet payments. In 2023, Indonesia, Malaysia, Thailand, Singapore, and the Philippines agreed to allow payments in their local currencies using their respective countries' QR code standards.[20] This initiative is expected to simplify payments, reduce transaction costs, and encourage regional trade. **However, challenges remain in expanding these systems to other member states and ensuring widespread adoption among businesses and consumers.**

Additionally, the Monetary Authority of Singapore (MAS) and the Bank for International Settlements (BIS) are driving the "Nexus" project to provide cross-border payments interoperability among the AMS. The prerequisite for joining the scheme is that each country has an instant payment system (IPS) which currently excludes five ASEAN countries: Brunei Darussalam, Cambodia, Myanmar, Lao PDR, Vietnam.[21] This demonstrates differing levels of digital readiness, slowing the progress of creating a unified payment ecosystem.

1.3.2. Lack of transparency and innovation in digitalization

Most ASEAN nations face slow improvements in digital adoption. Government-led initiatives often crowd out the digital landscape, leaving limited opportunities for private companies to participate and innovate. This approach restricts competition, innovation, slowing the pace of technological advancements. Additionally, disparities in infrastructure development further heighten the digital divide within and between countries.

[18] Digital Trade Priorities for ASEAN, US-ABC Staff, 2022
[19] SMEs and Economic Integration in Southeast Asia, Cassey Lee, Dionisius Ardiyanto Narjoko, Sothea Oum, editors, 2019, ISEAS – Yusof Ishak Institute / ERIA.
[20] HSBC Business Go. (2025). Hsbc.com. https://tinyurl.com/ypfrjcfu
[21] Singapore FinTech Festival. (2024). "GenAI in Production in Financial Services: Real or Not?" Gftn.co. https://tinyurl.com/rj9tzjrp

For instance, tourism is a vital sector for many ASEAN economies, but the adoption of digital tools to enhance the tourism experience remains underutilized. Digital platforms for booking, payment, and personalized travel experiences are not uniformly available, limiting the potential to attract and retain tourists. Furthermore, inconsistent digital infrastructure in remote and rural areas prevents many destinations from fully leveraging digital technologies to boost their appeal.

1.3.3. Rising Cybercrime Threats in Southeast Asia Undermine Economic and Digital Security

Cybercrime in Southeast Asia increased by 82% between 2021 and 2022, with the most frequent targets being Singapore, Thailand, Indonesia and Vietnam which had the highest digitalization rates, making them more attractive targets for cybercriminals.[22] Cyber scams, like phishing and social media fraud, have become a major problem in Southeast Asia. The rapid shift to digital, combined with low digital literacy, has made it easier for scammers to target vulnerable people. [23]

Cybersecurity threats pose a significant risk to economic stability. These threats can result in substantial financial losses for businesses, disrupt critical services, and erode public trust in digital systems.[24] Incidents such as ransomware attacks and data breaches impose substantial recovery costs on organizations and can negatively impact consumer confidence, thereby hindering economic growth.[25] Businesses also face reputational damage after breaches, losing customer trust and market value. SMEs are especially at risk, as they often lack the resources to recover from an attack.

Wired reported that China-linked cyberattacks on Southeast Asian countries increased by 20% in the second half of 2022, compared to the same time in 2021.[26] Chinese government-linked hackers also penetrated government servers to spy on several Southeast Asian nations—Thailand, Malaysia, Vietnam, Indonesia, Myanmar, and Cambodia— and stole sensitive email information from them between 2019 and 2022. This issue goes beyond digital security, it challenges the region's economic and social stability. With ASEAN's aim to be a zone of peace, freedom and neutrality, this goal emphasizes keeping the region free from interference by external powers that could create insecurity.[27]

1.3.4. The Tourism Industry's Struggle to Adapt to the Digital Age

Tourism remains a crucial pillar of ASEAN's economy, contributing 12% of GDP and supporting 42 million jobs before the pandemic.[28] However, the industry faces growing challenges, particularly in leveraging digital technology for sustainable and inclusive growth. While the projections for 2025 remain strong, ASEAN must ensure that tourism's rapid recovery is supported by digital transformation to enhance resilience, efficiency, and sustainability.

[22] Brock, J. (2024, July 16). ASEAN's Cyber Initiatives: A Select List | Strategic Technologies Blog | CSIS. Www.csis.org. https://tinyurl.com/aas5m44k
[23] Rahman, A. (2024, November 18). How ASEAN's Cybersecurity Push Could Protect People and Economies. Thediplomat.com; The Diplomat. https://tinyurl.com/2s3w3z9z
[24] Maurer, T., & Nelson, A. (2021, March). The global cyber threat to financial systems. International Monetary Fund. https://tinyurl.com/3uxn57et
[25] Ibid.
[26] Brock, J. (2024, July 16). ASEAN's Cyber Initiatives: A Select List | Strategic Technologies Blog | CSIS. Www.csis.org. https://www.csis.org/blogs/strategic-technologies-blog/aseans-cyber-initiatives-select-list
[27] Ibid.
[28] DEVELOPING SUSTAINABLE TOURISM IN A POST-COVID-19 ASEAN ASEAN for Business Bulletin. (2024). https://asean.org/wp-content/uploads/2024/03/ASEAN-for-Business-Bulletin-February-2024.pdf

Southeast Asia's tourism sector is showing strong performance, with several key destinations seeing significant growth. For instance, countries like Malaysia, Thailand, and Vietnam are experiencing substantial increases in tourist arrivals, indicating a robust recovery and rising demand. Singapore and Bangkok are also seeing heightened interest, with Singapore ranking among the top 20 trending global destinations.[29] Moreover, Bangkok has become the world's most visited city, surpassing major tourism hubs like London and Istanbul, further highlighting the region's growing appeal.[30]

Despite the potential of digital tools, many destinations still struggle with integrating smart tourism solutions, leveraging data for decision-making, and ensuring seamless digital connectivity for travelers. The lack of coordinated digital infrastructure limits ASEAN's ability to optimize tourism flows, improve visitor experiences, and promote lesser-known destinations. At the same time, the rise of overtourism in major hotspots like Bangkok, Singapore, and Bali highlights the urgent need for smarter crowd management strategies, which digital platforms and AI-driven insights could help address.

To build a sustainable, digitally-driven tourism ecosystem, ASEAN must prioritize quality tourism—moving beyond volume-driven growth to responsible, high-value tourism that balances economic benefits with cultural preservation and environmental sustainability. Digital platforms, AI-driven travel insights, and smart infrastructure are key to achieving this shift, yet adoption across ASEAN remains uneven.

1.4 KEY ACTIONS

Create a harmonized framework and trusted digital ecosystem

Facilitate discussion and advocate for adoption of CBPR and international standards for cross-border payments. Malaysia should prioritize creating a harmonized and trusted digital ecosystem in DEFA by the end of 2025. The ASEAN Framework on Digital Data Governance and the MCCs are steps toward harmonizing data protection regulations across the region. However, in keeping with the 'ASEAN Way', achieving true progress requires aligning and conceptualizing a common definition of trust to promote the principle of Data Free Flow with Trust (DFFT) in ASEAN. Malaysia must take the initiative to facilitate these discussions and advocate for the adoption of Global Cross-Border Privacy Rules (CBPR)[31] among AMS, fostering a unified and collaborative approach to secure and trustworthy cross-border data flows.

On a practical level, as data is compiled by organizations at global, national and local levels, it is difficult to distribute or share data across various disjointed applications and databases.[32] Technical interoperability allows for seamless sharing of data between systems and effective data utilization. To support this, investing in digital infrastructure—such as developing the systems and technologies that enable data

[29] https://www.travelandleisureasia.com/my/news/bangkok-crowned-the-worlds-top-tourism-city-for-2024/
[30] https://live.worldtourismforum.net/news/Catch-up-the-latest-news-in-tourism-industry/2024s-Most-Popular-Tourist-Destinations-Bangkok-Tops-the-List
[31] Oikawa, K. (July 2024). Future of Data Governance in Asia and Operationalisation of 'Data Free Flow with Trust' [Policy Brief]. Economic Research Institute for ASEAN and East Asia (ERIA). https://tinyurl.com/3t5p2sht
[32] Ibid.

centers to operate sustainably and securely within ASEAN—is key. In this context, public-private engagements should be encouraged, as the private sector can drive technological innovation while also helping to build local capacity across the region.

To promote seamless cross-border digital payments in ASEAN, adopting international standards and aligning regulatory frameworks is essential.[33] Utilizing globally recognized standards, such as ISO 20022, EMVCo, and open APIs, can significantly enhance interoperability among payment systems, fostering innovation and competition. These measures allow payment service providers and merchants, including MSMEs, to benefit from interconnected digital payment systems. However, it is crucial to ensure that all payment service providers have non-discriminatory access to the necessary infrastructure and services for the operation of digital payment systems, avoiding any arbitrary or unjustified restrictions intra-ASEAN.[34]

Encourage public-private partnerships in digital capacity building

Encourage a multi-stakeholder approach and leverage private sector resources to enhance capacity building.

ASEAN should also encourage more **public-private partnerships** (PPPs), especially in the technology-innovation sector. Creating a level playing field for both public and private firms to participate in national and regional digital initiatives can introduce competitive solutions and accelerate advancements. This multi-stakeholder approach can also promote higher transparency and facilitate open dialogues, allowing both sectors to share insights from past successes and challenges. This collaborative environment can unlock new opportunities for innovation and create a more inclusive, dynamic digital ecosystem across the region.

Public-private partnerships should be leveraged for ASEAN **digital capacity building** as well. Given the huge disparities in infrastructure between AMS, private sectors should be incentivized to conduct capacity-building programs. For instance, most ASEAN countries' tourism ministries are still at a basic level of technology use, where utilization of AI to drive productivity and efficiency is yet to be apparent. Companies like Expedia hold annual sessions to share experiences with ministries to encourage more digitally-oriented Ministries of Tourism. Similarly, partnerships like Mastercard's collaborations with local banks to develop fintech ecosystems highlight the potential of private-sector expertise in fostering innovation. Malaysia should connect private sectors with governments in these areas, to ensure efficient utilization of resources and expertise for regional digital transformation.

Build cooperative and resilient cybersecurity

Continue promoting regional cybersecurity policies and establish a regional cybercrime task force.

In October 2024, ASEAN members launched two major initiatives to enhance **cybersecurity:**[35] the ASEAN Regional Computer Emergency Response Team (CERT) and the Norms Implementation

[33] Public Version 2.0. (n.d.). https://tinyurl.com/2hrpayfm
[34] Ibid.
[35] Singapore and ASEAN Member States Deepen Commitment to Enhance Collective Cybersecurity in the Region. (2024). Default. https://tinyurl.com/yx6v38u8

Checklist introduced by the Cyber Security Agency of Singapore and Malaysia, to support the application of the 11 norms of responsible state behavior in cyberspace endorsed by the UN. This checklist serves as a practical guide for countries to assess and implement cybersecurity measures effectively. Malaysia can expand this checklist to other ASMs to form a consensus among the member states at government level, which will promote regional alignment on cybersecurity policies and practices.

Initiatives like ASEAN Cybersecurity Resilience and Information Sharing Platform (CRISP)[36] hosted by Malaysia should be continued in 2025. The platform focuses on cyber threat information-sharing and strengthening public-private partnerships. CRISP was praised by ministers in the 10th ASEAN Finance Ministers' and Central Bank Governors' Meeting in 2023 for its capacity building enhancement.

Tackling cyber scams at the source is challenging given that transnational organized crime groups thrive in SEA countries with limited cybersecurity and insufficient law enforcement capabilities.[37] They often collude with local power structures, like militant groups near the border of Myanmar.[38] AMS should establish a cooperative and coordinated cybersecurity task force to combat transnational cybercrime, which could share intelligence and coordinate responses and support, especially in weaker states. Most importantly, governments and educational institutions must promote digital literacy to reduce vulnerability to cyber scams and misinformation. Targeted campaigns could focus on raising awareness of phishing and fraud risks among citizens.

INDUSTRY LEADING PRACTICE:

MASTERCARD'S CYBERSECURITY RESILIENCE INITIATIVE: STRENGTHENING DIGITAL TRUST IN ASEAN

Recently Mastercard signed a Memorandum of Understanding (MoU) with the ASEAN Foundation, promising to roll out a whole range of initiatives across the bloc's member states to improve the cybersecurity of public sector entities and small and medium-sized enterprises (SMEs). Part of this initiative is a program called the ASEAN Foundation-Mastercard Cybersecurity Resilience Program. This program will focus its efforts on three main pillars: 1. Raising awareness, 2. Providing skills and training, and 3. Improving capacity through technology and intelligence.[39]

Private Sector initiatives will target more than 97% of the region's businesses that employ 85% of the population; these initiatives include:

1. Equipping SMEs to manage cyber incidents via the Mastercard Trust Center, an online self-service portal that provides free education, resources, and tools to support their cybersecurity journey.[40]
2. Enabling SMEs to identify vulnerabilities in their operations through Mastercard's My Cyber Risk, a tool which allows businesses to pinpoint, prioritize and act on cybersecurity threats to digital infrastructure.[41]
3. Keeping SMEs up-to-date about emerging threats and issues through cybersecurity workshops and webinars, as well as industry events on cybersecurity-related topics.[42]

[36] Brock, J. (2024, July 16). ASEAN's Cyber Initiatives: A Select List | Strategic Technologies Blog | CSIS. Www.csis.org. https://tinyurl.com/aas5m44k
[37] Rahman, A. (2024, November 18). How ASEAN's Cybersecurity Push Could Protect People and Economies. Thediplomat.com; The Diplomat. https://tinyurl.com/2s3w3z9z
[38] Ibid.
[39] Mastercard. (2024, November 2). Mastercard and ASEAN Foundation sign MoU to launch Cyber Resilience Program to bolster cybersecurity capacity across the region. Mastercard.com. https://tinyurl.com/yjbewy2e
[40] Ibid.
[41] Ibid.
[42] Ibid.

INDUSTRY LEADING PRACTICE:

Public sector initiatives will include:

1. Running cybersecurity webinars specifically designed for the challenges faced by ASEAN governments, providing expertise on key issues for public sector professionals in cybersecurity related roles.[43]
2. Conducting crisis simulation exercises to identify the cyber readiness and resilience of organizational technologies and processes, and to highlight areas where capabilities can be strengthened.[44]
3. Developing research reports, providing risk assessment tools for ASEAN governments and fostering public-private dialogues and collaboration to fight fraud.[45]

Mastercard's commitment to advancing ASEAN's Digital Economy vision is evident through the introduction of this program. During the launch event, Satvinder Singh, Deputy Secretary-General of ASEAN for the ASEAN Economic Community, praised Mastercard for its leadership in cybersecurity initiatives. He emphasized the company's significant role in cross-border payment solutions, highlighting its cutting-edge financial and security innovations as essential to enhancing global and regional cyber resilience and digital trust.

This initiative is particularly timely, as cybersecurity has been identified as a key priority for Malaysia's ASEAN Chairmanship in 2025. In a recent press release, Cybersecurity Malaysia outlined its vision for ASEAN, emphasizing the need to build a resilient digital ecosystem.[46] Many of the priorities and initiatives highlighted in the release align with Mastercard's comprehensive cybersecurity program, which focuses on protecting the region's digital infrastructure and equipping the workforce with essential cybersecurity skills. This approach closely reflects the objectives of the ASEAN Foundation-Mastercard Cybersecurity Resilience Programme. It is important for the Malaysian government to leverage key partnerships like the one with Mastercard.

Mastercard has been actively strengthening cybersecurity and promoting digital trust both globally and in Southeast Asia. The company partners with various industries, as well as the public and private sector, to address the growing threat of cybercrime. In the region, Mastercard plays a key role in initiatives such as the **United Nations Development Program's Global Coalition Against Digital Scams** and serves as the **Chair of the Global Anti-Scam Alliance.**[47]

Additionally, it collaborates with organizations to enhance cybersecurity expertise and workforce development, including the **FlexiMasters program in cybersecurity and digital trust with Nanyang Technological University in Singapore** and the **Indosat-Mastercard Cybersecurity Center of Excellence in Indonesia.**[48]

Promote digital inclusion and innovation

Enhance digital talent mobility, empower SMEs, expand e-commerce market access, and establish secure, interoperable digital identity systems for seamless cross-border services. To foster digital inclusion and innovation across ASEAN, it is critical to focus on building a robust digital talent pipeline and facilitating talent mobility across member states.[49] Investing in digital literacy and reskilling programs will equip individuals, particularly those in underserved communities, with the skills needed to thrive in a

[43] Mastercard. (2024a, November 2). Mastercard and ASEAN Foundation sign MOU to launch cyber resilience program to bolster cybersecurity capacity across the region. Mastercard Newsroom. https://tinyurl.com/3p27n2dc
[44] Ibid.
[45] Ibid.
[46] Cybersecurity. (n.d.-a). https://www.cybersecurity.my/data/content_files/44/1937.pdf
[47] Mastercard. (2024, November 2). Mastercard and ASEAN Foundation sign MoU to launch Cyber Resilience Program to bolster cybersecurity capacity across the region. Mastercard.com. https://tinyurl.com/yjbewy2e
[48] Ibid.
[49] Towards ASEAN Post-2025: A Collaborative Digital and Sustainable Economic Agenda, 2024, Kusnadi, Suwandhi https://tinyurl.com/2u5jd7nt

digitally-driven economy. Strengthening collaboration between governments, industries, and academia can also support the development of a future-ready workforce while enabling seamless cross-border mobility for digital professionals. These efforts ensure that ASEAN leverages its human capital to remain competitive in the global digital landscape.

Simultaneously, empowering SMEs and women entrepreneurs promoting secure, interoperable digital identities is essential to unlocking the potential of digital trade and e-commerce.[50] By providing SMEs with tools, funding, and market access, ASEAN can drive inclusive economic growth. The adoption of interoperable digital identity systems will streamline cross-border transactions, reduce operational inefficiencies, and enhance trust among stakeholders.[51] These actions, combined with harmonized regulations and investments in digital infrastructure, will enable ASEAN to bridge the digital divide and foster long-term socio-economic innovation and inclusion.

Facilitating regional alignment on AI governance

Amplify the ASEAN Guides on AI Governance and Ethics, ensuring alignment with domestic AI governance approaches, as well as create a regional AI regulatory sandbox for testing innovations.

AI has the potential to uplift ASEAN's GDP by 10–18%, contributing up to US$ 1 trillion by 2030, according to Kearney.[52] In ASEAN, six member states—Singapore, Vietnam, Thailand, Indonesia, Malaysia, and the Philippines—have developed national AI strategies.[53] At the regional level, ASEAN introduced the ASEAN Guide on AI Governance and Ethics, endorsed in February 2024, to promote a market-driven approach that balances AI's economic potential with its risks.[54] Additionally, the ASEAN Working Group on AI Governance (WG-AI)[55] was established to address governance challenges and ensure AI's responsible use.

The growing adoption of AI across ASEAN presents Malaysia with a unique opportunity to position itself as a regional AI hub. Rather than viewing governance concerns as obstacles, Malaysia can take the lead in shaping AI ethics and safety frameworks that enable innovation while preventing misuse. By championing a balanced approach to AI governance, Malaysia can ensure that AI benefits society while maintaining public trust and business confidence.

To achieve this, it is crucial that Malaysia avoid a prescriptive regulatory approach that could stifle innovation and hinder AI's growth. Instead of imposing rigid, one-size-fits-all regulations, the government should adopt a principles-based, adaptive framework that emphasizes transparency, accountability, and ethical AI use. This would allow AI developers and businesses to innovate while ensuring AI deployment aligns with fundamental values such as fairness, privacy, and inclusivity.

[50] Ibid.
[51] Ibid.
[52] Ibid.
[53] The quest toward developing an AI governance in ASEAN. (n.d.-g). https://asean.org/wp-content/uploads/2024/07/ASEAN-for-Business-Bulletin-Special-Edition.pdf
[54] Ibid.
[55] ASEAN Guide on AI Governance and Ethics Contents. (2024). https://asean.org/wp-content/uploads/2024/02/ASEAN-Guide-on-AI-Governance-and-Ethics_beautified_201223_v2.pdf

Malaysia's leadership in establishing the ASEAN AI Safety Network (ASEAN AI Safe) presents a significant opportunity to shape regional AI governance, but its success hinges on addressing internal and external challenges. As the ASEAN Chair, Malaysia must first strengthen its domestic AI governance through the National Artificial Intelligence Office (NAIO) and the National AI Roadmap to serve as a credible model for the region. The initiative requires a structured, phased approach, beginning with defining AI safety standards, followed by capacity-building efforts to bridge technological gaps, and culminating in a multi-stakeholder governance framework. Given ASEAN's diversity, harmonizing AI ethics, transparency, and regulatory frameworks is crucial to ensuring inclusive and responsible AI adoption. Malaysia must also lead efforts in AI risk mitigation, intellectual property protections, and algorithmic fairness, fostering a unified approach to AI safety across the region while balancing national priorities with collective ASEAN interests.[56]

Furthermore, with AI still in its early stages across ASEAN, Malaysia can spearhead regional efforts to harmonize AI ethics and regulatory frameworks, ensuring a cohesive yet flexible approach that encourages responsible AI adoption. By focusing on education, capacity-building, and cross-border collaboration, Malaysia can help shape ASEAN's AI future—not through rigid controls, but through leadership in governance and ethical best practices. This proactive role will not only strengthen Malaysia's position as a regional AI hub but also build a resilient AI ecosystem that fosters innovation while safeguarding public interest.

INDUSTRY LEADING PRACTICE:

GOOGLE'S ASEAN AI READY GRANT: A BEST PRACTICE IN AI LITERACY AND GOVERNANCE

Google has started an initiative called the ASEAN AI Ready Grant, which gives the ASEAN Foundation US$ 5 million.[57] Using this grant the ASEAN Foundation has launched AI Ready ASEAN, a regional initiative to build AI literacy across ASEAN member states. The program is supposed to span 2.5 years and equip 5.5 million individuals from ASEAN with essential AI skills. This program aims to prepare ASEAN youth, educators, and parents to thrive in the digital era and embrace AI responsibly and ethically.

The AI Ready ASEAN initiative will also contribute to the overall goals of the ASEAN Digital Masterplan 2025 and ASEAN Digital Economy Framework Agreement, which aim to build an inclusive and sustainable digital economy for ASEAN. The initiative will also follow the ASEAN Guide on AI Governance and Ethics, ensuring AI is adopted responsibly, with a focus on transparency, fairness, and inclusivity.

The program will adopt a train-the-trainer model, equipping 2,000 master trainers with the expertise to deliver comprehensive AI literacy training to over 800,000 beneficiaries across local communities.[58] In collaboration with local partners, the program will customize the curriculum to align with the specific needs of each ASEAN Member State, ensuring its relevance and effectiveness in diverse regional contexts.

[56] Khoo, S. (2025, February 11). How Malaysia could take the lead in ASEAN AI Safe. ISIS. https://www.isis.org.my/2025/02/12/how-malaysia-could-take-the-lead-in-asean-ai-safe/
[57] AI Ready ASEAN. (2025). ASEAN Foundation. https://www.aseanfoundation.org/ai_ready_asean
[58] Ibid.

INDUSTRY LEADING PRACTICE:

With the establishment of the National AI Office (NAIO) in Malaysia, it is essential for the country to leverage available resources such as Google's ASEAN AI Ready grant to enhance its efficiency and effectiveness. This strategic utilization will be crucial in positioning Malaysia as a regional leader in AI readiness, governance, and ethics within ASEAN.

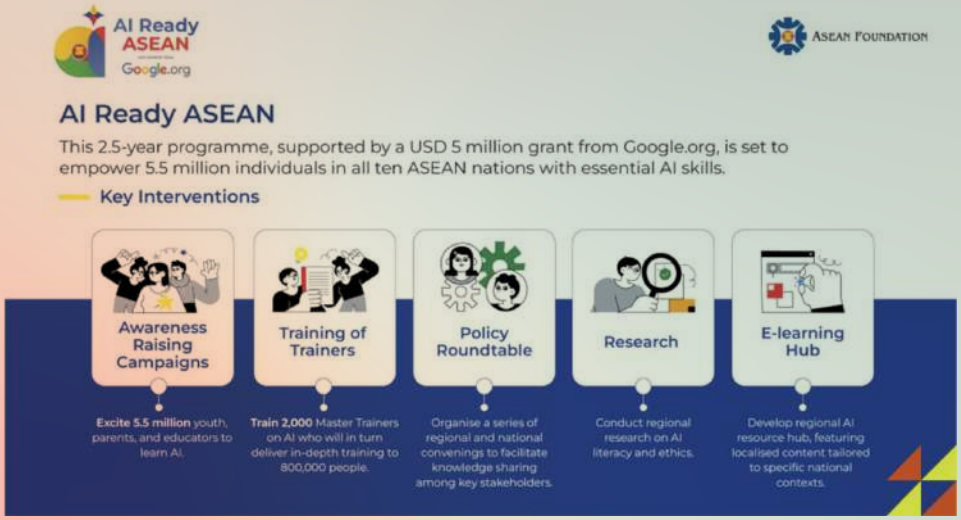


Figure 2 (Source: The ASEAN Foundation)

Leverage the Digital Economy for Tourism Transformation

Drive innovation, enhance connectivity, and promote sustainable growth in ASEAN's tourism sector. ASEAN should leverage the digital economy to accelerate tourism recovery, enhance resilience, and drive sustainable growth. By integrating AI, big data, and digital platforms, ASEAN can attract high-intent travelers, optimize tourism strategies, and empower businesses to remain competitive in a rapidly evolving landscape. To sustain long-term growth, ASEAN must embrace smart tourism innovation[59] rather than viewing digital adoption as a challenge. Online travel platforms, AI-driven insights, and seamless digital connectivity can enhance traveler engagement, improve efficiency, and promote sustainable tourism practices.

Rather than imposing rigid regulations that could slow innovation, ASEAN governments should adopt a principles-based, market-driven approach that fosters digital adoption while ensuring data security, transparency, and consumer trust. Malaysia, as ASEAN Chair, has a unique opportunity to lead this transformation by strengthening regional digital connectivity, fostering public-private partnerships, and driving sustainability initiatives. Establishing regional sustainability standards, alongside climate action training for tourism professionals, will ensure eco-friendly tourism practices are integrated into the digital ecosystem.

By embracing the digital economy as a driver of tourism growth, Malaysia can position itself as ASEAN's hub for smart, sustainable tourism, ensuring the region remains resilient, competitive, and future-ready in the global landscape.

[59] Hien, H. N., & Trang, P. H. (2024). Decoding smart tech's influence on tourist experience quality. Asian Journal of Business Research, 14(1), 97–118. https://doi.org/10.14707/ajbr.240167

Bridge the Digital Divide

Expand connectivity, enhance digital literacy, and ensure inclusive access to ASEAN's digital economy.

Malaysia should prioritize bridging the digital divide in ASEAN by ensuring affordable, high-quality internet access, digital literacy programs, and inclusive policies. While digital transformation is accelerating, disparities in connectivity, skills, and access to technology continue to limit economic opportunities, particularly in rural and underserved communities.

To address this, investments in rural connectivity, cross-border data flows, and cybersecurity awareness must be strengthened. Reducing internet costs and ensuring availability of high-speed internet coverage will be crucial in enhancing digital accessibility across ASEAN. Additionally, targeted digital upskilling programs should be developed to empower women, marginalized communities, and MSMEs, ensuring equitable participation in the digital economy. By taking proactive steps, Malaysia can position itself as a leader in ASEAN's digital inclusion agenda, ensuring that all member states benefit from the region's growing digital economy.

DRIVING ASEAN UNITY: MALAYSIA'S VISION FOR 2025

WORKFORCE DEVELOPMENT

KEY HIGHLIGHTS

- As ASEAN emerges as the world's fifth-largest economy, workforce development plays a critical role in sustaining regional competitiveness. The demand for AI, digital skills, and green energy expertise is rising, making upskilling and reskilling crucial for economic resilience. However, disparities in education and workforce preparedness across member states pose a challenge to achieving a highly integrated and adaptive labor market.

- ASEAN is shifting towards skills-based hiring to bridge the gap between labor market needs and workforce competencies. Traditional hiring practices that prioritize academic qualifications contribute to high youth unemployment and job mismatches. Malaysia, as ASEAN Chair in 2025, is advocating for the ASEAN Qualifications Reference Framework (AQRF) to support mutual recognition of skills across member states, enabling seamless labor mobility and workforce integration.

- Education systems in ASEAN struggle to keep pace with rapidly evolving industry needs. With only 28% of Malaysia's workforce classified as highly skilled, there is an urgent need for curriculum reform, industry partnerships, and modular learning pathways. Governments are investing in Technical and Vocational Education and Training (TVET) and short-term certification programs to address skill shortages in technology, digital innovation, and sustainability sectors.

- Women remain underrepresented in STEM and high-value industries, with only 35% of global STEM graduates being women. Gender biases, lack of mentorship, and limited access to upskilling programs hinder women's participation in future-proof industries. Additionally, rural communities and marginalized groups, including gig workers, older employees, and persons with disabilities (PWDs), require targeted upskilling programs to remain competitive in an increasingly automated job market.

- The lack of competency standardization across ASEAN creates hiring inefficiencies and limits workforce mobility. The region must establish unified skills assessment frameworks and promote lifelong learning initiatives to equip workers with future-ready skills. As ASEAN Chair in 2025, Malaysia aims to lead discussions on skills harmonization, foster stronger university-industry partnerships, and position ASEAN as a global hub for skilled talent.

2.1. BACKGROUND

Workforce development is the strategic process of equipping individuals with the skills and competencies needed to meet evolving labor market demands. In ASEAN, as the region emerges as a global economic hub, the demand for expertise in AI, digital technology, and green energy is increasing, making workforce development essential for sustained growth.

ASEAN's diverse economies and industries require a dynamic workforce to stay competitive in an interconnected world. Businesses face challenges from technological advancements, digital transformation, and shifting market demands, making effective workforce development crucial to fostering innovation, productivity, and resilience.

As the fifth-largest economy in the world, ASEAN's workforce will be instrumental in sustaining economic growth. However, disparities in education, training, and workforce preparedness exist across member states, highlighting the need for structured skill-mapping systems like the Skills Framework in the Philippines, which aligns labor market needs with workforce capabilities.

Governments must support upskilling and reskilling programs while encouraging employers to adopt skills-based hiring over traditional academic qualifications. This approach broadens the talent pool and ensures a better match between available jobs and workforce competencies. Collaboration between governments, educational institutions, and industries is key to preparing ASEAN's workforce for digital transformation and the green transition, where required skills are evolving rapidly.

Governments and industries can further this agenda by systematically identifying, mapping, and standardizing competencies across sectors. By developing clear frameworks and employing standardized tools such as skill tests, practical assessments, and competency-based interviews, companies can ensure fairness and accuracy in evaluating talent. These efforts align with regional initiatives like the ASEAN Qualifications Reference Framework (AQRF), which promotes lifelong learning and enhances the recognition of skills and qualifications across member states.

For example, an economy like Indonesia, which boasts ASEAN's largest labor force of over 136 million people, faces challenges in developing its talent pool to meet evolving labor market demands.[60] Currently, Indonesia has an estimated 55 million skilled workers. According to the Master Plan for the Acceleration and Expansion of Economic Development in Indonesia (MP3EI), the country will require 113 million skilled workers by 2030 to keep pace with market needs.[61] Recognizing its strengths, Indonesian policymakers are leveraging the country's expected demographic bonus, with 70% of the population projected to be of working age by 2030.[62] This demographic shift positions Indonesia for significant economic growth. To capitalize on this opportunity, policymakers are prioritizing vocational training to enhance workforce skills as the country aims to solidify its standing as a G20 member.

An innovation-driven economy like Malaysia has the potential to leverage its influence within ASEAN to enhance the bloc's position as a regional hub for international business and trade. As of October 2024, Malaysia's labor force participation rate stood at a robust 70.5%, while the unemployment rate remains low at 3.2%, reflecting a stable job market. This is the lowest unemployment rate in a decade, and the Ministry of Finance (MoF) projects this downward trend will continue into 2025, with total employment expected to grow by 2.1%.

Malaysia is rapidly emerging as a sub-regional interconnectivity hub for Southeast Asia. According to the World Bank, the country is on track to transition to a high-income economy between 2024 and 2028, despite setbacks caused by the pandemic.[63] However, only 28% of Malaysia's workforce is classified as highly skilled, and over half of jobs in the country are at risk of displacement due to technological advancements. This puts significant pressure on Malaysia to adapt its workforce to meet the demands of high-value industries such as technology, digital innovation, and finance.

To address these challenges, the Malaysian government has allocated a portion of Budget 2025 to talent upskilling and reskilling initiatives. This budget aims to establish a foundation for a more resilient and future-ready nation. Malaysia's 2025 ASEAN chairmanship presents a pivotal opportunity to shape the region's trajectory for the next two decades. By addressing rapid workforce transformations and rising demand for green skills, Malaysia can set a positive example and steer ASEAN towards long-term success.

[60] Briefing, A. (2022, April 26). Assessing the Current Human Resources Talent Pool in ASEAN. ASEAN Business News. https://tinyurl.com/2kkrsz9j
[61] Ibid.
[62] Ibid.
[63] Ibid.

2.1.1. Skills-Based Approach to Workforce Development

According to **TalentCorp Malaysia**, the Malaysian labor market faces three key challenges: a **shortage of high-skilled** jobs relative to the increasing number of graduates, a **mismatch between qualifications and job requirements,** and a **high youth unemployment rate,** particularly among those under 24. These issues stem from a disconnect between **industry demands and workforce qualifications,** making it difficult for job seekers to secure relevant employment. As illustrated in **Figure 3**, TalentCorp's analysis highlights the need for better alignment between education, training, and labor market needs to address these persistent challenges.

Figure 3 (Source: TalentCorp Malaysia)

Before assuming the ASEAN Chairmanship in 2025, Malaysia outlined one of its primary goals: to establish a highly integrated and cohesive ASEAN economy.[64] The aim is to create a deeply interconnected regional economy capable of sustaining high economic growth and demonstrating resilience in the face of global economic shocks and uncertainties.[65] As ASEAN Chair, Malaysia aspires to facilitate the seamless movement of goods, services, investments, capital, and skilled labor across member states.[66] This initiative seeks to strengthen ASEAN's trade and production networks while fostering a more unified market for businesses and consumers within the region.

A key component of addressing the aforementioned goal is to move away from traditional hiring practices that prioritize academic qualifications and adopt a skills-based approach to recruitment. As illustrated in Figure 3, reliance on outdated hiring methods has not effectively addressed Malaysia's unemployment challenges. Therefore, a comprehensive and transformative approach is required to reform the labor market and future-proof the workforce. By focusing on a skills-based hiring strategy, companies can better identify and prioritize the skills essential for specific roles, ensuring that hiring decisions are based on the abilities required to perform the job effectively, rather than solely on academic credentials.

[64] ASEAN 2025: Forging ahead together. (n.d.-a). https://tinyurl.com/2v6ttxvd
[65] Ibid.
[66] Ibid.

Companies should place greater emphasis on skills throughout resume writing, interview practices, and recruitment processes. Platforms such as LinkedIn play a crucial role in enabling individuals to identify, communicate, and showcase their skills effectively, thereby supporting employers in making data-driven, skills-based hiring decisions. This shift is particularly critical as job requirements evolve rapidly; LinkedIn data indicates that the skills needed for roles today have changed by approximately 40% over the past six to seven years.[67]

As ASEAN Chair, Malaysia should champion a skills-based approach to hiring, not only at the national level but also regionally across ASEAN. Standardizing skills-based hiring practices should be a regional priority to enhance workforce mobility and economic integration. According to the blueprint ASEAN 2025: Forging Ahead Together, another key goal for Malaysia is to facilitate the movement of skilled labor and business visitors within the region. This includes enabling professionals from various listed occupations to practice across ASEAN member states through mutual recognition of qualifications.[68] Where applicable, this goal can be further supported by implementing the ASEAN Qualifications Reference Framework (AQRF), which encourages voluntary participation by member states to promote lifelong learning and enhance recognition of skills and qualifications.[69]

Aligned with Malaysia's goal to enhance mechanisms for attracting foreign direct investment (FDI) in the service sector,[70] adopting a skills-based approach to hiring will significantly bolster the region's appeal to investors. By fostering greater skills integration across ASEAN, this approach ensures manpower mobility across member states. Such integration alleviates worries for companies and investors seeking to operate in ASEAN, as skilled workers become more easily transferable between nations. This, in turn, will encourage more global companies and multinational corporations (MNCs) to invest in the region, confident in the availability of an integrated, skilled workforce tailored to industry needs.

To achieve this, companies and industries must first identify the specific skills required to perform each job successfully in alignment with current labor market standards. Once identified, companies should analyze their existing talent pool to determine whether the available skills match the market demands. As highlighted by TalentCorp and illustrated in Figure 1, there is currently a significant gap between the skills available in the market and those needed. There is potential for TalentCorp to bring together companies and educational institutions, be it technical and vocational education and training (TVET) providers and universities, to co-design programs better suited to meet industry manpower needs and close the skills gap.

The government can empower companies to identify these critical skills and implement strategies to foster them internally, ensuring talent retention and development. This can be supported through government incentives such as scholarships, grants, and tax benefits for companies investing in skills development. Companies like Micron and AWS serve as exemplary models, demonstrating the effectiveness of initiatives like internships and in-house upskilling programs. These efforts help reorient talent pipelines toward industries that are prepared to meet future demands.

[67] T.Suresh, LinkedIn, personal communication, 30th October 2024.
[68] ASEAN 2025: Forging ahead together. (n.d.-a). https://tinyurl.com/2v6ttxvd
[69] Ibid.
[70] Ibid.

2.1.2. Advancing Quality Education: A Pillar for ASEAN's Economic Aspirations

Promoting quality education must be a cornerstone of ASEAN's workforce development strategy. To address disparities in educational quality and outcomes, institutes of higher education must evolve to cater to diverse learner groups, including mid-career professionals seeking to upskill. This can be achieved through flexible and accessible learning pathways such as bootcamps, short courses, and online certifications.

In Malaysia, for example, the government has allocated portions of Budget 2025 to talent upskilling initiatives, emphasizing the importance of building a future-ready workforce. Similarly, programs like Technical and Vocational Education and Training (TVET) have demonstrated success in bridging the skills gap by offering industry-relevant education. Such efforts must be scaled regionally to ensure that all ASEAN member states can benefit from best practices and shared resources.

Currently, many ASEAN nations face challenges in producing a sufficient number of qualified and skilled graduates to meet industry demands, which are increasingly driven by advancements in technology, green energy, and digital transformation. For instance, Malaysia, in its pursuit of becoming a high-tech nation by 2030, has set an ambitious target of increasing the proportion of STEM students to 60%.[71] However, progress remains slow. In 2020, only 47% of Malaysian students were enrolled in STEM fields.[72] By the end of 2022, data from the Board of Engineers Malaysia revealed approximately 187,900 registered engineers, translating to a national engineer-to-population ratio of 1:170.[73] To achieve its 2030 vision, Malaysia must effectively double its engineering workforce. These figures underscore the critical need for Malaysia to invest in its educational infrastructure and modernize curricula to incorporate future-focused courses. This investment must prioritize equipping students with skills that align with emerging industries and technologies. However, fostering such a transformation cannot be confined to national borders. To truly develop a highly skilled and integrated labor force, these educational reforms must extend across ASEAN, ensuring regional cooperation and standardization. By addressing these systemic challenges collectively, ASEAN can not only bridge the educational divide but also position itself as a hub for innovation and economic growth in the global arena.

Tertiary education plays a critical role in shaping Malaysia's human capital and driving sustainable economic growth. However, across ASEAN member states, tertiary education frameworks face systemic and structural challenges that hinder their ability to produce a workforce aligned with the demands of modern industries. These limitations have led to many graduates accepting employment that does not match their qualifications or study fields, with some resorting to non-standard forms of work.

While Malaysia has seen an increase in graduate employability rates since 2010, these statistics often fail to reflect the realities of employment outcomes and evolving graduate behavior.[74] For instance, only around 60% of graduates secure jobs immediately upon graduation.[75] A study by the Khazanah Research Institute (KRI) highlights a growing trend among graduates toward non-standard employment, including contract work, social media roles, part-time jobs, and self-employment.[76]

71 cue. (2023, March 28). Malaysia wants more Stem students and engineers to drive tech ambitions | The Straits Times. Www.straitstimes.com. https://tinyurl.com/48uvs8kp
72 Ibid.
73 Ibid.
74 SHIFTING TIDES CHARTING CAREER PROGRESSION OF MALAYSIA'S SKILLED TALENTS BOOKLET. (n.d.). https://tinyurl.com/2a9t7yfm
75 Ibid.
76 Ibid.

A significant issue faced by young graduates is a persistent skills mismatch. Many are unable to find employment in their fields of study or accept roles that require lower qualifications and offer reduced pay. This disconnect stems from outdated university frameworks and curricula, which fail to align with the skill requirements of emerging industries such as technology, green energy, and advanced manufacturing. Consequently, graduates often lack the practical and technical expertise needed for high-demand roles, exacerbating the skills mismatch challenge.

Additionally, many tertiary education systems emphasize theoretical knowledge over practical training or problem-solving abilities. According to KRI, graduates of Technical and Vocational Education and Training (TVET) programs have higher employment rates post-graduation than their non-TVET counterparts,[77] indicating the value of more hands-on, industry-relevant education.

Universities often prioritize technical knowledge and academic achievement, while overlooking the cultivation of essential soft skills such as communication, leadership, adaptability, and teamwork. This oversight leaves graduates unprepared for the collaborative and dynamic environments of modern workplaces. Employers frequently note that while new hires may demonstrate strong technical competencies, they often lack the interpersonal and leadership abilities needed for effective teamwork and organizational success. This deficiency not only hampers individual career progression but also impacts business performance, as companies increasingly value professionals with well-rounded capabilities who can adapt to challenges, inspire teams, and foster productive workplace relationships. Integrating soft skills training into university curricula is critical to preparing graduates holistically for the demands of the modern workforce.

Another pressing issue is the insufficient collaboration between universities and the private sector. This gap limits students' access to valuable opportunities such as internships, apprenticeships, and real-world industry exposure, leaving them underprepared for workplace demands. Without strong partnerships, universities struggle to bridge the divide between academic learning and professional requirements, resulting in a workforce that often lacks the workplace-relevant competencies highly valued by employers.

Strengthening these collaborations is vital to equipping students with the skills and experience needed to excel in their careers. By fostering robust partnerships with industries, universities can provide students with practical training, mentorship, and exposure to real-world challenges, ensuring they graduate with the skills required to thrive in a competitive job market.

[77] Ibid.

2.2. CHALLENGES

2.2.1. The Lack of Standardized Competency Assessments in ASEAN Hinders Workforce Development and Hiring Practices

The absence of standardized competency assessments across ASEAN creates significant inconsistencies in hiring practices and workforce development. Without a unified framework to define and measure necessary skills, employees often require extensive training and retraining, which reduces efficiency and increases costs for organizations.[78] These inconsistencies make it challenging for employers to identify and develop the right talent, limiting the potential for a cohesive and productive workforce. Furthermore, rapid advancements in AI, automation, and sustainability are accelerating changes in job requirements, presenting ongoing challenges for both employers and employees. Many workers struggle to keep pace with these developments, while companies face difficulties in identifying and addressing emerging skill gaps swiftly enough to remain competitive.

2.2.2. The Limited Recognition of Non-Traditional Skills and Misalignment with Industry Needs Hinder Workforce Inclusivity and Readiness

Another critical issue is the narrow scope of recognized skills. Many organizations fail to acknowledge capabilities acquired through unconventional methods such as volunteer work, micro-credentials, and bootcamps, which prevents them from accessing a diverse and capable talent pool. This limited recognition often overlooks non-traditional candidates who can bring valuable perspectives and skills to the workforce. Compounding these challenges is the insufficient alignment between traditional educational programs and the rapidly evolving demands of industries. Universities and training institutions often lack the agility to adapt their curricula to meet the specific and changing needs of employers, leaving graduates underprepared to contribute effectively in their roles.

2.2.3. The Rapid Evolution of Industry Outpaces University Curricula, Creating a Skills Gap for Graduates

The pace of industrial evolution, particularly in technology and innovation, poses a significant challenge for universities striving to align their curricula with rapidly changing market demands. Traditional curriculum structures often lack the flexibility to adapt quickly, leaving students with skills that may become obsolete by the time they enter the workforce. This misalignment between the objectives of academia and the expectations of industry is further exacerbated by the emphasis universities place on foundational and theoretical knowledge, whereas employers prioritize practical skills and hands-on experience. As a result, graduates frequently find themselves underprepared to meet the real-world demands of the workforce, limiting their ability to contribute effectively in professional settings. Additionally, the absence of mechanisms to monitor emerging industry trends and anticipate skill requirements hinders universities from proactively updating their programs. This disconnect not only reduces the relevance of academic offerings but also hampers students' ability to future-proof their skill sets in an increasingly competitive job market.

[78] Forfar, G. (2020). Riding the wave of tidal energy. Copadata.com. https://tinyurl.com/3whdn5cm

2.3. KEY ACTIONS

Adopt a systematic approach to skills mapping

Establish standardized competency assessments to align job roles with industry needs and streamline hiring practices. To address these challenges, it is essential to establish standardized competency assessments and adopt a systematic approach to skills mapping, such as the Skills Framework in the Philippines. A regionally unified framework can help align job roles with industry needs, reduce inconsistencies in workforce development, and streamline hiring practices. By implementing standardized tools such as skill tests, practical assessments, and competency-based interviews, organizations can ensure fairness, accuracy, and efficiency in evaluating talent. Governments can play a pivotal role by providing incentives for skills development through initiatives like grants, scholarships, and tax benefits, encouraging companies to invest in their workforce.

INDUSTRY LEADING PRACTICE:

LINKEDIN'S SKILLS ASSESSMENT: A TOOL FOR SKILLS-BASED HIRING AND WORKFORCE DEVELOPMENT

As companies increasingly adopt skills-based hiring, **LinkedIn's Skills Assessment** has emerged as a valuable tool for recruiters and hiring managers to efficiently evaluate candidates' technical, business, and design skills. The assessment covers over 80 different skills, and individuals who score in the top 30% receive a skills badge on their profile, enhancing their credibility and visibility to potential employers. Additionally, **LinkedIn's Learning Center** offers resources to help organizations develop comprehensive training programs, enabling employees from diverse backgrounds to acquire the necessary skills for career advancement. For learning and development professionals, implementing an internal upskilling program can strengthen talent pipelines, support employee growth, and enhance long-term workforce development.

Promote lifelong learning

Implement strategies to close gaps in fast-changing demands of the labor market. Promoting lifelong learning and continuous skill development is essential in responding to the fast-changing demands of the labor market. As rapid technological advancements and automation reshape industries across ASEAN, it is crucial to ensure that all workers—including marginalized groups such as gig workers, older workers, and persons with disabilities (PWDs)—have access to upskilling opportunities. Without targeted training, these groups risk being left behind, exacerbating unemployment and economic inequalities. Studies indicate that Asia-Pacific countries could see higher GDP growth of 1 to 7% with disability-inclusive employment, highlighting the economic benefits of fostering an inclusive workforce.[79]

[79] Overview: Disability in the ASEAN Region. (2021). https://tinyurl.com/z33fhudk

Broaden the recognition of skills acquired

Allow organizations to tap into a more diverse talent pool be recognizing unconventional methods of acquiring skills. Broadening the recognition of skills acquired through unconventional methods such as volunteer work, micro-credentials, and bootcamps will allow organizations to tap into a more diverse talent pool. Recognizing and prioritizing these non-traditional skills can enhance workforce effectiveness, adaptability, and innovation. Regional collaboration initiatives, such as the ASEAN Year of Skills spearheaded by Malaysia's Ministry of Human Resources (KESUMA) and HRD Corp in partnership with the International Labour Organization (ILO), provide a strong foundation for fostering skills standardization and development across ASEAN.[80] Such efforts underscore the importance of a unified approach to preparing the region's workforce for future challenges and opportunities.

Enhance Curriculum Adaptability

Ensure universities align education with industry needs by adopting modular designs, industry collaborations, and work-integrated learning programs.

To ensure ASEAN's workforce remains competitive in a knowledge-based economy, universities must adopt modular curriculum designs that allow for incremental updates in response to evolving industry needs. This approach ensures that educational content remains relevant and aligned with the latest advancements in technology, AI, and green industries. Establishing a dedicated task force to monitor industry trends and identify emerging skill requirements can further enhance the adaptability of academic programs. By collaborating with industry leaders, these task forces can keep universities informed about the competencies most valued by employers, reducing the growing mismatch between graduates' skills and labor market needs.

However, gaps in educational attainment across ASEAN pose a significant challenge, particularly in rural communities. A World Bank Group analysis, using data from the UNESCO Institute for Statistics (UIS), highlights stark disparities in lower secondary completion rates across the region.[81] Cambodia and Laos fall below the world average, while data for Myanmar has been unavailable since 2019, indicating a lack of transparency in educational progress.[82] These disparities limit employment opportunities, hinder socio-economic mobility, and exacerbate inequality, leaving a significant portion of the rural population underemployed or unemployable.

To address these challenges, ASEAN must prioritize systemic and structural reforms in education, ensuring that students from all backgrounds have access to quality learning opportunities. Many rural communities face inadequate infrastructure, including poorly equipped schools, unreliable internet connectivity, and a shortage of qualified teachers. Additionally, a lack of vocational training programs tailored to industry demands leaves many young people unprepared for the job market. To close these gaps, universities and technical institutions should introduce short-term certification courses in high-demand fields such as data analytics, artificial intelligence, and green technology. These micro-credentials provide practical, job-ready expertise, complementing traditional degree programs and equipping students with flexibility in meeting current market needs.

[80] Online, T. S. (2024, December 2). ASEAN gears up for year of skills 2025. https://tinyurl.com/2veb88k8
[81] Lower secondary completion rate (% of relevant age group) | World Bank Gender Data Portal. (n.d.). World Bank Gender Data Portal.
[82] Ibid.

As ASEAN continues its digital and economic transformation, it is crucial to create an inclusive education system that aligns with workforce demands. By integrating modular curricula, industry-driven certifications, and targeted reforms to improve rural education, ASEAN can bridge skill gaps, reduce inequalities, and build a resilient workforce ready for the future.

Integrate Practical Learning

Equip students with industry-relevant skills through capstone projects, work-integrated learning programs, and the development of transferable skills. Universities must prioritize an integrated approach to learning by blending theoretical instruction with application-focused modules, such as capstone projects, which allow students to apply academic concepts to real-world scenarios. Implementing Work-Integrated Learning (WIL) programs, including internships, co-op placements, and apprenticeships, as mandatory components of degree structures can offer students invaluable workplace exposure and the opportunity to develop industry-relevant skills before graduation. Beyond practical experience, universities should emphasize the cultivation of transferable skills such as critical thinking, problem-solving, and adaptability, enabling students to navigate diverse professional challenges and adjust to the evolving needs of employers. By adopting these strategies, universities can bridge the gap between academic and industry objectives, producing graduates who are not only academically proficient but also workplace-ready, capable of making meaningful contributions from the outset of their careers.

Advancing Gender Equity in STEM and Emerging Industries

Strengthen policies, promote inclusive education, and support women's participation in AI, green technologies, and STEM fields. Despite comprising nearly half of ASEAN's population, women remain underrepresented in high-growth sectors such as artificial intelligence, green technologies, and STEM. According to UNESCO, women account for only 35% of tertiary STEM graduates worldwide, a figure that has remained stagnant for the past decade.[83] Gender biases and systemic barriers continue to deter women from pursuing STEM careers, contributing to their underrepresentation in ASEAN's technology-driven workforce. While 68% of countries have policies supporting STEM education, only half of these policies specifically address gender inclusion, highlighting the need for targeted reforms.

Promoting gender equity in talent development is not just a social justice issue but also an economic imperative. Studies consistently show that diverse teams drive innovation and productivity, and by unlocking the full potential of women in STEM, ASEAN can significantly enhance its global competitiveness.[84] Governments must implement comprehensive policies that support women's participation in STEM education, AI, and digital industries, ensuring they have access to mentorship, scholarships, and career development programs.

To bridge this gap, ASEAN should integrate gender-inclusive STEM education policies, foster public-private partnerships that promote women in technology and expand reskilling and upskilling programs tailored to women transitioning into emerging industries. By strengthening policies, ensuring equal access to STEM education, and fostering a more inclusive workforce, ASEAN can close the gender gap, drive innovation, and create a more equitable and competitive regional economy.

[83] Support girls and women to pursue STEM subjects and careers. Unesdoc.unesco.org. (n.d.). https://unesdoc.unesco.org/ark:/48223/pf0000391937/PDF/391937eng.pdf.multi

[84] POLICY BRIEF STRENGTHENING ASEAN WOMEN'S PARTICIPATION IN STEM. (2022). https://tinyurl.com/3z9hhsrn

DRIVING ASEAN UNITY: MALAYSIA'S VISION FOR 2025

HEALTHCARE

KEY HIGHLIGHTS

- Robust healthcare systems in ASEAN rely on accessibility, affordability, quality services, skilled personnel, and efficient referrals. In ASEAN, including Malaysia, disparities in healthcare infrastructure, resource limitations, and the burden of non-communicable diseases (NCDs)–attributed in part to high smoking rates–pose significant challenges that undermine efficient healthcare delivery. Traditional mitigation strategies like smoking bans and dietary changes have had limited success, highlighting the need for more holistic interventions. Additionally, counterfeit medicines pose severe risks to public health and safety.

- Key indicators such as pandemic preparedness, pharmaceutical standards, and complexities in nutritional policies reveal inefficiencies in most ASEAN countries. For instance, narrowly focused and prescriptive interventions may lead consumers to switch to equally unhealthy food alternatives and place a disproportionate burden on F&B industries and low-income households.

- A balanced approach to address these disparities across the region necessitates collaborative efforts, policy reforms, and increased investments in healthcare. The harm reduction model in healthcare focuses on minimizing the adverse effects of harmful behaviors, such as smoking, by promoting less harmful alternatives.This pragmatic approach integrates consumer education, regulatory balance, and strategies to reduce NCD burdens.

- The ASEAN digital healthcare sector is rapidly growing, driven by a tech-savvy middle class and the need for accessible, efficient healthcare solutions. Accelerated by Covid-19, the market is projected to reach US$6.1 billion by 2024. The ASEAN Post-2015 Health Development Agenda emphasizes digital health for universal coverage and better outcomes. In Malaysia, initiatives like MySejahtera, MyDIGITAL, and private sector efforts like DoctorOnCall position the country as a regional leader in digital health innovation.

- Digital healthcare like Telemedicine, Track and Trace, and Outbreak Tracing enhance the regional ability to contain outbreaks, comply with international standards, fight counterfeit medicines, and foster a unified public health ecosystem attentive to public health concerns across ASEAN. Leveraging technological advancement, Malaysia's leadership in these areas can foster a unified, efficient, and resilient digital healthcare ecosystem.

3.1 BACKGROUND

Healthcare in ASEAN reflects the region's diversity, with significant variations in access, infrastructure, and quality across its 10 member states. ASEAN faces a dual burden of disease, where non-communicable diseases (NCDs) such as diabetes and cardiovascular diseases remain prevalent.[85]

Disparities in healthcare spending are stark between the member states, with high-income Singapore allocating over $17.95 billion in 2023,[86] while low-income Cambodia's expenditure amounted to only $573 million.[87] This highly unequal spending leads to inadequate healthcare outcomes, exacerbating issues such as maternal mortality and insufficient healthcare services. Compounding this challenge is the issue of counterfeit medicines, which affects many ASEAN countries, particularly in regions where regulatory frameworks and enforcement mechanisms are weak.

As the region grapples with rising NCDs, there is a growing demand for healthcare that prioritizes both sustainability, accessibility, and affordability. The complex interplay of urbanization, aging populations, and lifestyle changes has contributed to the rise in NCDs, necessitating multifaceted solutions that extend beyond conventional healthcare approaches.[88] To address these challenges, the region is increasingly embracing digital healthcare technologies, enabling patients to receive timely consultations, monitor chronic conditions, and access preventive care without the constraints of geographical barriers. While ASEAN countries continue to implement health regulations, harm reduction policy models start to emerge as the better alternative in the war against NCDs; simultaneously minimizing financial burden in healthcare while encouraging businesses to shift towards healthier alternatives. Integrating these strategies into regional frameworks can ensure that ASEAN advances toward equitable, resilient, and sustainable healthcare systems.

3.2. DIGITAL HEALTHCARE

The digital healthcare sector in ASEAN is growing, and can address disparities in healthcare access, enhance efficiency, and improve patient outcomes. The Covid-19 pandemic dramatically accelerated the wide adoption of digital health technologies, demonstrating the potential to bridge healthcare gaps across the region. Coupled with the region's large and growing tech-savvy middle class, the demand for personalized digital healthcare solutions has increased, driving substantial growth in the digital health market, which is projected to reach nearly US$6.1 billion in revenue by 2024.[89] The ASEAN Post-2015 Health Development Agenda (APHDA) placed a strong emphasis on digital healthcare in championing universal health coverage and improving health outcomes. The agenda outlined the goals for 2021-2025, encompassing healthy lifestyles, emergency response, robust health systems, and food safety.

In Malaysia, initiatives like MySejahtera were a significant milestone in the country's transition towards digital healthcare; a response to the demand for effective contact tracing in the midst of the pandemic. With initiatives like MyDIGITAL and collaborations

[85] ASEAN BioDiaspora Virtual Center (ABVC) COVID-19, Mpox, and Other Infectious Diseases. (n.d.). Retrieved from https://tinyurl.com/5duvyzsj

[86] HEAD OF MINISTRY OF HEALTH OVERVIEW Mission Statement. (n.d.).Retrieved from: https://tinyurl.com/2mrc96w8

[87] David. S. Govt budget for healthcare nearly doubles over past decade (2024). Retrieved from Khmer Times - Insight into Cambodia website: https://tinyurl.com/3vvpxhm9

[88] Norris, S., H Anuar, Matzen, P., Cheah, J., Jensen, B., & Hanson, M. (2014). The life and health challenges of young Malaysian couples: results from a stakeholder consensus and engagement study to support non-communicable disease prevention. BMC Public Health, 14(S2). https://doi.org/10.1186/1471-2458-14-s2-s6

[89] M&A Explorer. Digital healthcare in Southeast Asia offers healthy returns. (2019). Retrieved from: https://tinyurl.com/54ksyk5c

with global tech leaders,[90] Malaysia is poised to leverage its growing digital infrastructure to spearhead the region's digital health revolution. Furthermore, the strong presence of private sector participation in healthcare, such as the DoctorOnCall service,[91] offers an opportunity for cross-sector collaboration, fostering fertile ground for health tech advancements.

3.3. ROBUST HEALTHCARE INFRASTRUCTURE

Access to quality healthcare services, including disease prevention, adaptability, high-quality service, well-trained healthcare personnel, and an efficient referral system. In the context of ASEAN and Malaysia, addressing inadequate and unequal healthcare infrastructure is critical due to significant regional disparities, resource limitations, and the dual burden of NCDs and infectious diseases.[92] Overall, public healthcare is concerned with protecting the health of an entire nation's population, often focusing on limiting health disparities, and preventing illness from recurring through implementing educational programs.

Assessing the healthcare landscape in ASEAN involves examining several key indicators, including pharmaceutical standards, healthcare efficiency, life expectancy, infrastructure capacity, and pandemic preparedness. A study assessing healthcare systems in Asian countries, including ASEAN, found that 91.3% (42 out of 46 countries) of the healthcare systems in Asian countries were inefficient in utilizing healthcare resources, with only a few countries like Singapore and Japan demonstrating high efficiency.[93] While ASEAN countries strive for harmonized pharmaceutical regulations through initiatives like ASEAN Common Technical Requirements (ACTR) to ensure quality and safety,[94] challenges remain, such as the prevalence of counterfeit medicines and varying manufacturing standards. Collaborative efforts, policy reforms, and increased investments in healthcare are essential to address these disparities and achieve better public health outcomes across the region.

3.4 CHALLENGES

3.4.1. The Rising Burden of NCDs in ASEAN: Economic Strain and the Need for Innovative Health Strategies

In the ASEAN region, NCDs account for at least 62% of all deaths, or over 9 million deaths per year. The region's economies and healthcare systems are adversely impacted by the growing presence of NCDs. Chronic respiratory diseases, diabetes, and cancer are the main NCDs that contribute to this burden.[95] The economic impact of NCDs is profound, with households bearing significant financial burdens due to treatment and management costs, often resulting in individuals being solely responsible for covering the cost of their healthcare through out-of-pocket payments and catastrophic health expenditures, leading to impoverishment.[96] Additionally, the rate of premature deaths due to NCDs occur at the highest rates in low and middle-income countries, where approximately 95%

[90] Malaysia Digital Health. (2024). Retrieved from https://tinyurl.com/3m5394d5
[91] Doctoroncall.com.my. (2016). Malaysia's Online Pharmacy | Order Medicine, Consult Doctor Online. Retrieved from: https://tinyurl.com/2eapws6u
[92] Sisubalan, N., Sivamaruthi, B. S., Kesika, P., & Chaiyasut, C. (2024). Addressing health inequities in Southeast Asia: challenges and opportunities. The Lancet Regional Health - Southeast Asia, 28, 100455. https://tinyurl.com/z5saxfu9
[93] Ahmed, S., Hasan, M. Z., MacLennan, M., Dorin, F., Ahmed, M. W., Hasan, M. M., . . . Khan, J. a. M. (2019). Measuring the efficiency of health systems in Asia: a data envelopment analysis. BMJ Open, 9(3), e022155. https://tinyurl.com/ja68k8uv
[94] ASEAN Common Technical Requirements. (2024). Retrieved from: ASEAN Main Portal website: https://tinyurl.com/yc8pm777
[95] WHO. (2019). Noncommunicable diseases - SEARO. Retrieved from Who.int website: https://tinyurl.com/pwhcss3h
[96] Wang, H., Torres, L. V., & Travis, P. (2018). Financial protection analysis in eight countries in nonnninithe WHO South-East Asia Region. Bulletin of the World Health Organization, 96(9), 610-620E. https://tinyurl.com/9ktswstr

of Asia's population resides.[97] Effective interventions are needed to adequately manage the burden placed by NCDs on healthcare systems through demographic and epidemiological transitions.

The rising incidence of NCDs in the ASEAN region is significantly driven by diabetes and smoking. Smoking remains a major risk factor for diseases such as lung cancer, heart diseases, and chronic respiratory conditions.[98] Traditional mitigating efforts such as public smoking bans and higher taxation on tobacco products have shown mixed results due to a lack of a holistic approach in tackling tobacco consumption. Similarly, Type-2 Diabetes, fueled by poor diet and physical inactivity, continues to rise despite efforts to promote healthier lifestyles and improve healthcare access.[99] The persistence of high NCD rates calls for more innovative strategies to be tailored to existing policies and societal realities.

Integrating harm reduction strategies within NCD policies could significantly alleviate this burden. By recognizing better alternatives to smoking, ASEAN countries can advance public health outcomes and reduce the prevalence of NCDs. These health strategies are essential to address the intertwined challenges of smoking and NCDs, fostering healthier populations and more resilient healthcare systems.

3.4.2. COVID-19 Exposes Healthcare Vulnerabilities: Resource Shortages and the Need for Coordinated Regional Response

The COVID-19 pandemic placed immense pressure on healthcare systems across the ASEAN region, exposing critical weaknesses in public health infrastructure. Consequently, numerous nations grappled with shortages of medical personnel and inadequate healthcare funding, which hindered their capacity to effectively manage the outbreak of the virus. This situation was exacerbated by mounting national debt and disrupted supply chains, unprecedentedly placing burdens on already weak healthcare systems.[100] This situation was particularly acute in ASEAN countries with less developed healthcare systems, such as Laos and Cambodia. In contrast, wealthier nations such as Malaysia and Singapore were able to deploy much more advanced public-private collaborations to maintain capacity, outsourcing healthcare services or pharmaceutical deliveries.[101,102]

The pandemic also intensified the demand for healthcare professionals, who worked tirelessly to meet the demands of outbreak containment because of the existing shortage of medical personnel. In some areas, health systems approached the "red line". Hospitals in major cities like Jakarta and Surabaya in Indonesia reported ICU occupancy rates exceeding 90%. To maintain the operability of the hospitals, some patients were turned away due to lack of beds, and oxygen supplies became critically

[97] Wang, H., Song, Y., Ma, J., Ma, S., Shen, L., Huang, Y., . . . Zou, Z. (2023b). Burden of non-communicable diseases among adolescents and young adults aged 10–24 years in the South-East Asia and Western Pacific regions, 1990–2019: a systematic analysis for the Global Burden of Disease Study B 2019. The Lancet Child & Adolescent Health, 7(9), 621–635. https://tinyurl.com/mr3r5auc

[98] Gan, H., Hou, X., Zhu, Z., Xue, M., Zhang, T., Huang, Z., . . . Sun, B. (2022). Smoking: a leading factor for the death of chronic respiratory diseases derived from Global Burden of Disease Study 2019. BMC Pulmonary Medicine, 22(1). https://tinyurl.com/ycx3u5mh

[99] Araneta M. R. (2019). Engaging the ASEAN Diaspora: Type 2 Diabetes Prevalence, Pathophysiology, and Unique Risk Factors among Filipino Migrants in the United States. Journal of the ASEAN Federation of Endocrine Societies, 34(2), 126–133. https://doi.org/10.15605/jafes.034.02.02

[100] The ASEAN Admin. (2024). Navigating Turbulence: Lessons Learned from COVID-19 Response in the South-East Asia Region and the Way Forward - The ASEAN Magazine. The ASEAN Magazine. https://tinyurl.com/yx32j72p

[101] Tan, C. S., Lokman, S., Rao, Y., et al. (2021). Public and private sectors collective response to combat COVID-19 in Malaysia. *Journal of Pharmaceutical Policy and Practice*, *14*, 40. https://doi.org/10.1186/s40545-021-00322-x

[102] BBC News (2021). Indonesia faces oxygen crisis amid worsening Covid surge. [online] Bbc.com. Retrieved from: https://tinyurl.com/574k762d

scarce, leading to the neglect of other essential services related to NCDs in the process.[103] Despite existing frameworks for health security and disaster response, ASEAN's collective actions were limited, with individual nations implementing differing strategies ranging from strict lockdowns to minimal restrictions. This challenge significantly undermined public health resilience and highlighted the urgent need for a more coordinated and robust regional approach to health security.

3.4.3. Digital Divide in ASEAN Healthcare: Barriers to Access and Health Equity

Individuals in low-income households and those living in rural areas may face significant barriers to accessing digital healthcare services. These barriers can include limited access to reliable internet, wearable health trackers, or app-based services, and the digital skills needed to use online platforms and understand health information. This can create a digital divide, where individuals with limited access are excluded from receiving quality healthcare. For instance, commercial internet providers may overlook rural areas due to perceived lower profitability, resulting in lower coverage for the local population to access digital services.[104] ASEAN member states are urged to ensure inclusivity in advancing digital health initiatives, ensuring that no individual is excluded.

3.4.3. Lack of Centralized Data Sharing: Impeding an Pandemic Response

ASEAN countries took significant steps to strengthen pandemic management during COVID-19. Initiatives like the ASEAN BioDiaspora Virtual Centre leveraged big data and analytics for outbreak tracking, particularly in cross-border disease monitoring, helping governments make informed decisions.[105] However, real-time data sharing and interoperability across countries still remain as challenges. Coupled with the lack of a centralized data-sharing platform, this has impeded real-time information exchange, crucial for coordinated and concerted pandemic responses. The absence of a centralized data-sharing system for outbreak tracking in ASEAN has significantly hindered effective cross-border public health responses. For instance, while some countries like Singapore had advanced digital health tools and robust tracking mechanisms, countries like Myanmar and Laos struggled with underdeveloped health infrastructure and limited resources.[106] These disparities have highlighted the need for region-wide investment in surveillance capabilities in ensuring rapid detection and containment of emerging diseases. Addressing these issues is crucial for enhancing regional health security and ensuring a more resilient response to future outbreaks.

3.4.5. Counterfeit Medicines in ASEAN: A Growing Threat to Public Health and Safety.

The ASEAN region has become a significant hub for the production and distribution of counterfeit medicines, driven by a combination of factors, including the increasing demand for affordable medication and barriers in regulatory enforcement. As a substantial healthcare market, with Indonesia leading in size followed by Vietnam and

[104] Bridging the Digital Divide: Fostering Inclusivity in Southeast Asia's Digital Economy. (2023). Retrieved From: https://tinyurl.com/4xwws4nm

[105] The ASEAN. (2024). Revolutionising Biological Threat Intelligence - The ASEAN Magazine. The ASEAN Magazine. https://theaseanmagazine.asean.org/article/revolutionising-biological-threat-intelligence/

[106] Liu, Y., Gong, L., Niu, H., Jiang, F., Du, S., & Jiang, Y. (2024). Health system efficiency and equity in ASEAN: an empirical investigation. Cost Effectiveness and Resource Allocation, 22(1). https://doi.org/10.1186/s12962-024-00588-3

Thailand, the ASEAN bloc presents immense commercial growth opportunities for pharmaceutical companies. However, the prevalence of fake pharmaceuticals undermines these prospects, endangers vulnerable populations, and poses risks to the returns on investment for research and development.[107] The counterfeit medicines observed within the region range from weight loss medications, infertility drugs, falsified anti-cancer treatments, to other generic medications. The problem is worse in remote areas with limited healthcare access, leaving residents with no choice but to rely on unregulated medicine providers due to cost and convenience.[108] According to a UNODC report, ASEAN consumers spend between US$ 520 million to US$ 2.6 billion annually on these falsified medicines, making it one of the region's most significant transnational organized crimes, alongside illicit drug markets, human trafficking, migrant smuggling, and wildlife trafficking.[109]

According to the World Health Organisation (2024), falsified medicines pose a great risk to public health, leading to severe and often fatal consequences. Patients may unwittingly ingest medications containing harmful substances or incorrect dosages, leading to poisoning, ineffective treatment, or worsening of their conditions. Such counterfeit products can also contribute to the rise of drug-resistant infections, rendering previously treatable diseases life-threatening.[110] Indirectly, the economic burden can drain families' savings and limit their access to effective treatments, disproportionately affecting disadvantaged communities, who are most vulnerable to the harmful consequences of counterfeit medicines.

Furthermore, the challenges contributing to the spread of counterfeit medicines are the ASEAN regions' weak cross-border regulations, diverse regulatory frameworks, and growing pharmaceutical markets. With corruption playing a significant role, and the recruitment of former pharmaceutical company executives and state officials that are well-versed in the national regulatory and industrial system, syndicates can easily take advantage of this bureaucratic loophole. As counterfeit medicines remain a significant public health challenge in the ASEAN region, undermining public health, safety standards, and trust in the healthcare systems, there is a dire need to address this critical issue through enhancing supply chain transparency and fostering cooperation to safeguard public health and safety across ASEAN.

3.4.6. Improper Medicine Disposal: Environmental and Public Health Risks

The World Health Organisation (WHO) has recently cautioned that pharmaceutical pollution in the region is a growing concern, particularly antibiotic pollutants from manufacturing processes. Antibiotic pollution may lead to the emergence of novel, drug-resistant bacterial strains, compromising public health and global health security.[111] Furthermore, general medicines that are improperly disposed of–such as flushing down the toilet or throwing them in the trash– are at risk of contaminating water, soil, landfills, posing an environmental hazard. Thus, safe disposal of unused medicines helps in preventing environmental contamination, misuse, and health risk. Regardless, there is still very little known about the occurrence of pharmaceutical

[107] Redfearn, N. (2022). Pharma and consumer health product counterfeiting across South East Asia. Retrieved March 17, 2025, from Rouse.com website: https://rouse.com/insights/news/2023/pharma-and-consumer-health-product-counterfeiting-across-south-east-asia
[108] The ASEAN Post. (2020). Lucrative fake medicine trade in ASEAN. The ASEAN Post. Retrieved from: https://tinyurl.com/ydkymxzv
[109] Win, N., Tun, A., & Marohabutr, T. (2024). Transnational Cooperation among ASEAN Member States to Fight Against Counterfeit Medicines. Retrieved from: https://tinyurl.com/2fnzt9az
[110] World Health Organization: WHO. (2024). Substandard and falsified medical products. Retrieved from: https://tinyurl.com/45bfxvw8
[111] World Health Organization. WHO. (2024) New global guidance aims to curb antibiotic pollution from manufacturing. Retrieved from:

substances in bodies of water in Southeast Asian countries due to the rapid growth of the pharmaceutical industry and inadequate environmental regulations to support further research.[112]

3.4.7. Navigating the Complexities of Sugar-Sweetened Beverage Regulation in ASEAN

ASEAN has implemented various regulatory measures, such as sugar taxes and labeling requirements, in response to the prevalence of NCDs and malnutrition. In an effort to curb the rise of NCDs, Thailand introduced a tiered excise tax on sugar-sweetened beverages (SSBs) in September 2017. This policy, which levies higher taxes on beverages with sugar content, incentivizes manufacturers to reformulate their products.[113] Following Thailand's lead, other countries in the region, including Philippines, through the Tax Reform for Acceleration and Inclusion (TRAIN) Act, have enacted similar regulations on SSBs,[114] reflecting a growing regional focus on fostering healthier dietary habits. The effectiveness of these interventions remains contentious and need to be studied.

Evidence shows that while sugar-sweetened beverage (SSB) taxes can lead to reduced consumption, their overall impact on public health, such as obesity rates and NCD prevalence is limited. For instance, a study in Thailand estimated that a 20% to a 25% SSB tax could reduce consumption and decrease obesity prevalence by approximately 3.83% to 4.91%.[115] However, the persistent increase in NCDs regardless of these measures indicates that focusing solely on specific product content may not address the complex factors contributing to poor health outcomes. NCDs are influenced by a complex combination of dietary habits, and physical activity. Furthermore, the social and cultural values of SSBs and the interplay between food and traditions tend to be an overlooked component in the discussion. For example, traditional beverages such as cendol and teh tarik in Malaysia and Singapore, or kopi across various Southeast Asian countries, are integral to the socio-cultural functionalities to communities.[116] Similarly to the large-scale production of SSBs that benefits from the economy of scales; often consumed due to their extended shelf-lives, efficiency, and affordability.[117] It is therefore crucial to implement innovative strategies, such as reformulating beverages to reduce sugar content without compromising taste, or promoting portion control, which can result in a more balanced and affordable healthcare outcome.

Including F&B industries in the regulatory conversation would allow for a meaningful dialogue between stakeholders to propagate evidence-based policy making. Collaborative efforts between policymakers and industry players are crucial to formulate interventions that are both effective in improving public health and pragmatic for industry implementation. While regulatory interventions aimed at certain food categories, such as SSBs or processed-food, are crucial parts of public health strategies, they ought to be a fraction of a broader, more holistic approach.

[112] Hashim, N., Yuzir, A., Al-Qaim, F. F., & Yahaya, N. K. E. (2021). Occurrence and Distribution of 17 Targeted Human Pharmaceuticals in Various Aquatic Environmental Matrices in Southeast Asia with Particular Reference to Malaysia: A Comprehensive Review. Journal of the Mexican Chemical Society, 65(3). Retrieved from: https://tinyurl.com/bdcwb82v

[113] Utensute, N. (2021) Sugar sweetened beverages tax in Thailand, 11th IMF-Japan High-Level Tax Conference for Asian Countries, p. 3.

[114] Onagan, F. C. C., Ho, B. L. C., & Chua, K. K. T. (2018). Development of a sweetened beverage tax, Philippines. Bulletin of the World Health Organization, 97(2), 154–159. Retrieved from: https://tinyurl.com/4sjnnf28

[115] Phonsuk, P., Vongmongkol, V., Ponguttha, S., Suphanchaimat, R., Rojroongwasinkul, N., & Swinburn, B. A. (2021). Impacts of a sugar sweetened beverage tax on body mass index and obesity in Thailand: A modelling study. PLoS ONE, 16(4), e0250841. Retrieved from: https://tinyurl.com/54rw9tav

[116] Sawyer, L. (2024). Southeast Asia Street Food : An Intersection of Culture and History. Retrieved from: https://www.foodbeverage-outlook.com/food-beverage-insights/an-intersection-of-culture-and-history

[117] Most Malaysians want to eat healthy but find it too costly. (2019). Retrieve from: https://tinyurl.com/bdf2zh9k

1.4 KEY ACTIONS

Establish a Balanced Regulatory Framework for Harm Reduction

Promote evidence-based policies and regional collaboration to support public health while fostering innovation. The harm reduction model in healthcare is a public health strategy designed to minimize the adverse health effects associated with harmful behaviors, such as smoking, alcohol, and other high-risk lifestyle habits. Complementary to smoking cessation efforts, the harm reduction method aims to reduce the negative effects of smoking by providing smokers with less harmful alternative nicotine products. This evidence-based approach is acknowledged by public health authorities. For instance, the US FDA claimed that alternative nicotine products, as newer innovations, might have the potential to help current cigarette smokers, approving marketing the products as a modified risk tobacco product (MRTP).[118] By focusing on pragmatism to reduce health risks, it recognizes the challenges many individuals face in quitting smoking. This suggests a multifaceted approach that integrates consumer education, regulatory balance, and strategies to alleviate the healthcare burden in ASEAN, particularly from NCDs.[119]

Navigating the regulatory landscape requires a balance between fostering innovation and ensuring public health outcomes. Hence, an approach that prioritizes consumer education and empowering informed choices is essential. By equipping consumers with the knowledge to make healthier lifestyle decisions and understand the implications of their choices, governments and businesses can drive demand for less harmful and more sustainable products without the need to implement prohibitive regulatory frameworks that impede growth.

Similarly, incentivizing innovations in low- and no-sugar, reduced-fat, and other healthier food options is crucial for advancing public health in ASEAN. Encouraging food manufacturers to reformulate products to contain less sugar, fat, and salt can lead to healthier consumption patterns and reduce the prevalence of NCDs. Such reformulation efforts are recognized as crucial steps in improving the nutritional quality of widely consumed foods. Furthermore, food fortification, the process of adding essential vitamins and minerals to commonly consumed foods, also helps in addressing micronutrient deficiencies and preventing non-communicable diseases (NCDs).[120]

To promote these healthier options, on top of implementing taxes for food and beverages ASEAN Member States can implement other incentives for food and beverages with incrementally reduced sodium, sugars, and fats. Collaborating with the food and beverage industry to explore evidence-based incentives can encourage the production of healthier products, benefiting public health.

Lastly, collaboration across various sectors, including health, trade, and education, ensures a comprehensive approach. Regional campaigns aimed at educating the public about the benefits of alternative innovative products in the market further solidify support for these measures. Ultimately, these cooperative efforts within ASEAN create a supportive environment for harm reduction policies, significantly improving public health outcomes across the region.

[118] FDA Media Availability On Comprehensive Regulatory Plan to Shift Trajectory of Tobacco-Related Disease, Death. (2017). Retrieved from: https://tinyurl.com/mtdekcvc

[119] WHO. Reducing risks and detecting early to prevent and manage noncommunicable diseases. (2023). Retrieved from Who.int website: https://tinyurl.com/ysc3fp9v

[120] World Bank. (2022). Food fortification. Retrieved from: https://www.who.int/health-topics/food-fortification#tab=tab_1

Establish a Balanced Regulatory Framework for Nutritional Innovation

A holistic approach on nutritional policy is needed in ASEAN to advance science-driven policies and strengthen regional partnerships. **Firstly, a holistic approach on nutritional policy allows for well-informed decisions that are tailored to the actual needs of ASEAN stakeholders. To facilitate this, engaging more with the food industry in policy discussions can lead to more effective interventions.** Collaborative efforts may result in formulation of more healthy food compositions, and marketing strategies that promote consumer education. Creating an environment that incentivizes these changes, rather than imposing punitive measures, can encourage further industry participation and fast-track innovation in delivering healthier products.

Secondly, regulatory sandboxes are needed to allow businesses to test healthier products or services under a controlled environment. The goal of a regulatory sandbox is to encourage innovation in a safe and responsible way, creating an environment that enables the transition to healthier alternatives rather than stifling it.[121] A notable example of this approach is the United Kingdom's regulatory sandbox for cultivated meat. This initiative focuses on supporting novel food innovations and streamlining the entry of healthier food alternatives in the market.[122] By leveraging regulatory sandboxes, ASEAN countries can create an environment that encourages the F&B industry to innovate responsibly. A collaborative approach, through government-supported incentives and investment in R&D are few examples of the actionable items.

As a holistic approach that prioritizes consumer education, ASEAN can mandate a region wide program focusing on nutrition literacy in schools, workplaces, and communities. Simultaneously, businesses can be incentivized to innovate healthier products and actively contribute to consumer education efforts. In that way, both consumers and businesses will benefit, empowering each side to move towards healthier choices, and creating a collaborative environment where public health in ASEAN and innovation thrive simultaneously.

Additionally, it is important to note that for low-income households, the high cost of nutritious food compared to processed, nutrient-poor alternatives remains a significant challenge.[123] To address this, **ASEAN should encourage the food industry to innovate and offer affordable, healthy options to ensure a reliable supply of nutritious, affordable food for all households.** Promoting seamless trade and reducing barriers for fresh produce can enhance accessibility, while collaboration on sustainable agriculture and knowledge sharing among member states can boost production, reduce waste, and stabilize food prices.

As ASEAN faces increasing pressure to meet **environmental, social, and governance (ESG)** goals, Malaysia's leadership in this area will be crucial in facilitating regional collaboration, driving innovation, and fostering a sustainable future for ASEAN. In championing sustainability through showcasing a strong commitment to global best practices, Malaysia can pave the way in promoting a regulatory environment that prioritizes the balance between innovation and growth, promoting cost-effective and sustainable business strategies.

[121] Walsh, C. (2021). Everything you need to know about regulatory sandboxes. Retrieved from State Policy Network website: https://spn.org/articles/what-is-a-regulatory-sandbox

[122] UK Government to create regulatory sandbox for cultivated meat. (2024). Retrieved from: https://tinyurl.com/yfxn4yen

[123] Eng, C. W., Lim, S. C., Ngongo, C., Sham, Z. H., Kataria, I., Chandran, A., & Mustapha, F. I. (2022). Dietary practices, food purchasing, and perceptions about healthy food availability and affordability: a cross-sectional study of low-income Malaysian adults. BMC Public Health, 22(1). https://doi.org/10.1186/s12889-022-12598-y

Develop a Comprehensive Framework for Safe Pharmaceutical Disposal

Advance sustainable drug disposal practices and protect public health and the environment. In 2010, the Ministry of Health Malaysia (MOH) implemented the **"Return Your Medicines Program,"** enabling patients to return unused or excess medications for safe disposal. Concurrently, Universiti Malaysia collaborated with CARiNG Pharmacy on the safe drug disposal program known as **Dispose of Unused Medicines Properly (D.U.M.P).** This program allows patients to return unused medicines for safe disposal by providing designated bins at all public health clinics and government hospitals in Malaysia.

Malaysia's early adoption of such programs underscored its commitment to embrace sustainable practices in the healthcare sector. Public awareness campaigns and collaboration with pharmacies and healthcare facilities have been crucial to the program's success, demonstrating the importance of partnerships and a holistic approach in healthcare initiatives. Moreover, a notable 44.5% of respondents exhibited prior knowledge of appropriate medical disposal procedures and associated awareness campaigns. Despite the success of Malaysia's Return Your Medicine initiative in improving compliance, common barriers such as inconvenience, location, and time constraints present more room for improvements.[124] Addressing the environmental impact of improper drug disposal requires collaborative measures across the region, as environmental health becomes a shared priority among the member states.

In ASEAN, Malaysia's D.U.M.P initiative has become a crucial model for addressing pharmaceutical waste and its associated health and environmental risks. Applying this initiative on a regional stage in ASEAN can promote environmental preservation and enhance public health standards across the region. Malaysia should also encourage neighboring countries to adopt similar practices and foster regional collaboration. Activities might include capacity-building workshops, policy harmonization dialogues, and sharing best standards of practice.

Strengthen Digital Healthcare Frameworks in ASEAN

Advance equitable access, supply chain security, and outbreak management through innovative technologies and regional collaboration.

A. Telemedicine: Enhancing Healthcare Access Through Digital Medicine and Hybrid Solutions

Telemedicine, the practice of providing healthcare remotely using digital technologies, enables healthcare providers to treat patients virtually, overcoming geographical constraints and improving healthcare access and delivery.[125] The components of telemedicine feature facilitating real-time communications between healthcare professionals and patients, storing and sharing patients' data for later review, and remote transmission of healthcare data to healthcare specialists through wearable devices.[126] Telemedicine can be utilized to address

[124] Ling, J. Y., Ng, P. Y., Shamsuddin, A. S., Aziemah Zulkifli, & Lee, K. E. (2024). Medication Disposal Patterns and Practices with Awareness of Environmental Contamination Caused by Pharmaceuticals among the General Public in Malaysia. Asian Pacific Journal of Cancer Prevention, 25(8), 2723–2734. Retrieved from: https://tinyurl.com/45vp9kvd

[125] Sharafkhaneh, A., Salari, N., Khazaie, S., Ghasemi, H., Darvishi, N., Hosseinian-Far, A., . . . Khazaie, H. (2022). Telemedicine and insomnia: a comprehensive systematic review and meta-analysis. Sleep Medicine, 90, 117–130. https://doi.org/10.1016/j.sleep.2022.01.016

[126] BioPharma Dive. (2023). 8 key components of a telemedicine program that delivers an exceptional patient experience. [online] Retrieved from: https://tinyurl.com/mrx7f3a2

the region's healthcare challenges, including uneven access to medical service, shortage of healthcare providers, and low population density in rural areas.

However, it is also important to acknowledge an existing digital divide, especially for populations living in remote areas with limited access to the internet and therefore, digital services. To deliver a service that provides equitable access to healthcare, a hybrid model that combines telemedicine with in-person consultations to ensure access to appropriate care for all patients, can ensure that everyone has access to the care they need, regardless of their technological capabilities or location. This blended approach will ensure that no one is left behind in the evolving landscape of healthcare delivery, especially low-income individuals who already face financial constraints in accessing traditional healthcare. Furthermore, this approach has been successfully implemented in various contexts; for instance, a study reported that 84.8% of patients were satisfied with a hybrid telemedicine model, with 80.8% experiencing maintained or improved quality of life.[127] By accommodating the needs of diverse populations for healthcare access and needs, the hybrid model promotes inclusivity in healthcare delivery.

Malaysia can develop comprehensive telemedicine guidelines to ensure uniformity in service delivery, quality, and patient safety across the region, especially for member states with later telemedicine adoption. Malaysia, as a hub for regional healthcare, should invest more in ongoing research in assessing telemedicine's impact on healthcare outcomes, patient satisfaction, and cost-effectiveness, guiding future policy decisions in ASEAN. By fostering an innovative approach to telemedicine, Malaysia and ASEAN can collectively enhance digital healthcare infrastructure, paving the way for more accessible, equitable, and efficient healthcare delivery across the region.

INDUSTRY LEADING PRACTICE:

ZUELLIG PHARMA'S EZCONSULT: ENHANCING TELEMEDICINE ACCESS IN SOUTHEAST ASIA

Zuellig Pharma's eZConsult was launched in August 2020 in the Philippines, contributing significantly to the realm of telemedicine across the region. eZConsult is a mobile application designed to provide seamless, secure, and safe access to healthcare services. It connects users with a wide network of healthcare professionals across various specialties and partners with retail pharmacies, laboratories, and fintech companies to provide holistic support, ensuring the varieties of health service options despite geographical restraints. This initiative addresses the growing need for teleconsultations, especially after the period of restricted movements.[128]

[127] Chen, M., Said, N. M., Camelia, N., Ho, F., Ling, N., Chun, M., ... Pang, A. (2022). Remaining Agile in the COVID-19 pandemic healthcare landscape – How we adopted a hybrid telemedicine Geriatric Oncology care model in an academic tertiary cancer center. Journal of Geriatric Oncology, 13(6), 856–861. https://doi.org/10.1016/j.jgo.2022.04.006

[128] Zuellig Pharma. (2020). Retrieved from: https://tinyurl.com/3rw76fcn

B. Track and Trace: Combating Counterfeit Medicines through Digital Verification

Track and trace technology refers to the use of digital systems, such as barcodes, blockchains, RDIF tags, and GPS for the purpose of monitoring and tracing the movement of healthcare goods. This technology guarantees the authenticity and the safety of products throughout their journey from manufacturing to the end-consumer by providing an end-to-end visibility of healthcare products.[129] By allowing patients to verify medication authenticity through QR codes on packaging, it addresses counterfeit medicine issues, ensuring safety and compliance.

In ASEAN healthcare, this system can bolster efficiency, security, and transparency of the healthcare supply chain, thereby reducing the risk of counterfeit drugs entering the market and harming public health. By implementing the track and trace technology, the region can reduce the burden on the healthcare system through ensuring that only legitimate and regulated products reach the customers. Furthermore, enhancing compliance with international good manufacturing practices (GMP) guidelines through technology will position Malaysia as a leader in healthcare digitization, fostering greater trust and attracting international stakeholders and investors in the region.

INDUSTRY LEADING PRACTICE:

ZUELLIG PHARMA'S EZTRACKER: PIONEERING BLOCKCHAIN-POWERED SUPPLY CHAIN TRACEABILITY

Zuellig Pharma's eZTracker, Asia's first blockchain-powered supply chain traceability solution, enhances resilience with real-time tracking and cold-chain monitoring. This blockchain-powered smartphone application is designed to combat counterfeit medicines by enabling consumers to verify the authenticity of medical products through barcode scanning. Launched in 2020 in Hongkong and Thailand, eZTracker ensures full traceability during distribution, even in rural areas, and provides immediate notifications to manufacturers and authorities if unregistered products are detected. This technology maps the chain custody to improve visibility, enhances competitive advantage, and provides granular insights for better decision-making. In response to the COVID-19 pandemic, Zuellig Pharma enhanced eZTracker to include a vaccination tracker, offering patients reliable information about the vaccines they receive and helping to overcome vaccine hesitancy.

[129] Healthcare traceability and GS1 standards | GS1. (2001). Retrieved from: https://tinyurl.com/ms2ye9kz

C. Outbreak Tracing: Enhancing ASEAN's Public Health Through a Regional Health Data Exchange System

Recognizing the absence of centralized data-sharing systems for disease outbreaks in ASEAN and its impediment on effective cross-border public health response, **ASEAN can greatly benefit its public health sector through developing a Regional Health Data Exchange System to facilitate real-time sharing of outbreak-related information across member states.**[130] This platform should include interoperable systems that ensure secure, seamless communication between ASEAN members, especially those with disparate levels of technological advancement. Leveraging technologies, transparency and efficiency can be safeguarded; Malaysia, with a lead in digital advancement, can kickstart the initial stages of the system while proposing it on a regional stage. Implementing this framework can significantly enhance the regional ability to contain outbreaks, fostering a unified public health ecosystem attentive to public health concerns across ASEAN.

[130] Rosencrance, L. (2019). Regional Health Information Organization (RHIO). Retrieved February from: https://tinyurl.com/2bw4sj4w

DRIVING ASEAN UNITY: MALAYSIA'S VISION FOR 2025

SUSTAINABILITY

KEY HIGHLIGHTS

- ASEAN's rapid economic growth has led to significant environmental challenges, including deforestation, pollution, and unsustainable resource consumption, which threaten both ecological integrity and public health. To address these issues, ASEAN is adopting a circular economy approach that emphasizes minimizing waste and conserving resources. This strategy aims to create a sustainable economic model by rethinking traditional "take-make-dispose" processes in favor of practices that extend the life cycle of materials and products.

- ASEAN faces significant environmental challenges, including transboundary waste management, plastic pollution, water scarcity, flooding, and rising carbon emissions. Transboundary movement of waste, particularly plastics, has exacerbated environmental degradation. Additionally, the region's rapid urbanization and industrialization have contributed to deforestation, pollution, and greenhouse gas emissions, further impacting environmental stability and public health.

- ASEAN should implement an Extended Producer Responsibility (EPR) scheme to improve waste management and promote a circular economy. Additionally, adopting technology-driven waste management frameworks utilizing AI and blockchain can improve transparency and efficiency in waste tracking and recycling processes. Integrated Water Resources Management (IWRM) systems and integrating green infrastructure in urban development are few of the key actions that can enhance environmental sustainability.

- ASEAN's sustainability reporting frameworks are evolving to enhance transparency and attract investments, with member states at varying adoption levels. However, regulatory diversity poses challenges like administrative burdens, non-compliance risks, and fragmented data.

- A harmonized ASEAN framework, blending international standards with regional specifics, is essential for fostering comparability, reducing environmental impacts, and advancing regional sustainability goals toward a green and circular economy. For Scope 3 emissions, representing indirect value chain emissions, phased implementation acknowledges measurement complexities, allowing companies to develop robust mechanisms.

4.1. CIRCULAR ECONOMY AND NATURAL RESOURCES

ASEAN is endowed with rich natural resources, however with rapid economic growth comes a substantial environmental cost. The region is experiencing deforestation, pollution, unsustainable resource consumption, and climate change. These environmental issues, if left unaddressed, threaten not only the ecological well-being of ASEAN countries but also the health and livelihood of their populations. For instance, in many ASEAN countries, unsustainable resource extraction practices have led to widespread deforestation and habitat losses for ASEAN's rich flora and fauna.[131] This coupled with growing pollution and waste management issues, continues to exacerbate environmental threats.

To ensure a sustainable future, ASEAN must implement a holistic and multi-faceted approach to prioritize aspects of the environment such as waste management, water conservation, circular economy principles, and sustainable business practices. By adopting a circular economy approach that minimizes waste, conserves resources, and stimulates economic growth, ASEAN can establish a much cleaner, greener, more resilient, and prosperous future for its individuals. Furthermore, ASEAN boasts a rich biodiversity, a home to a vast array of unique plant and animal species which adds to the importance of maintaining ecological balance and ensuring long-term health of ecosystems in ASEAN.

In parallel with the adoption of a circular economy, there is also a growing emphasis in ASEAN to focus on developing a standardized sustainability regulatory framework that promotes sustainable business practices. This framework can help streamline regulation, reduce inconsistencies, and promote the adoption of best practices. Operating on shared best practices would accelerate ASEAN's transition to green technologies and foster a breeding ground for innovation, investments, and solutions.

Malaysia, as a regional leader for ASEAN in 2025, is well-positioned to champion these actions by leveraging its own advancements, whether in green financing or well-established infrastructure. In doing so, ASEAN will not only address its current environmental challenges but will also lay the foundation for long-term, sustainable growth and prosperity for generations to come.

[131] Hughes, A. C. (2017). Understanding the drivers of Southeast Asian biodiversity loss. Ecosphere, 8(1). https://doi.org/10.1002/ecs2.1624

Circular Economy in ASEAN

A circular economy is an economic model designed to minimize waste and maximise efficient usage of resources by creating a closed-loop system. It focuses on rethinking traditional "take-make-dispose" processes in favor of sustainable practices that extend the life cycle of materials and products. The circular economy strives to minimize environmental damage by reducing resource consumption and waste generation through promoting resource efficiency. This will drive a more resilient and sustainable economy, creating profound effects on growth opportunities within ASEAN and improving the quality of life for its citizens.

Malaysia is actively transitioning towards a circular economy. In August 2024, The Ministry of Local Government Development launched the **Circular Economy Blueprint for Solid Waste (2025-2035)**, aiming to achieve a 40% national recycling rate through five key pillars.[132] Concurrently, the **Ministry of International Trade and Industry (MITI)** introduced the **Circular Economy Policy Framework for the Manufacturing Sector, aiming to help Malaysia transition to a circular economy and achieve its Net Zero goal by 2050.**[133] These initiatives demonstrate a concerted government effort to promote sustainable practices across various sectors, positioning Malaysia as a leader in regional circular economy efforts.

USABC has commended ASEAN's efforts, particularly the adoption of the Framework for Circular Economy for the ASEAN Economic Community in 2021, which focuses on five strategic priorities to transition towards a greener and sustainable economy. Furthermore, **the ASEAN Circular Economy Business Alliance (ACEBA)**, launched in July 2024, aims to provide leadership and action for regional circular economy transition by promoting best practices through peer learning, advocacy, and networking.[134]

In parallel, the UN Environment Assembly began negotiations toward a **Global Plastics Treaty** in March 2022, aiming to develop an international legally binding instrument on plastic pollution, addressing the full lifecycle of plastics, including production, design, and disposal.[135] By aligning the objectives of the **Circular Economy Agreement with the Global Plastics Treaty**, ASEAN, under Malaysia's chairmanship, can strengthen its commitment to sustainability, foster regional collaboration, and amplify its commitment to sustainability and circular economy practices across the region.

[132] Team, C., & Team, C. (2025). Malaysia Releases Circular Economy Blueprint for Solid Waste (2025-2035) | ChemLinked. Retrieved from ChemLinked website: https://sustainability.chemlinked.com/news/malaysia-releases-circular-economy-blueprint-for-solid-waste-2025-2035

[133] MITI launches Circular Economy Policy Framework to promote sustainable manufacturing growth. (2024). Retrieved from MIDA | Malaysian Investment Development Authority website: https://www.mida.gov.my/mida-news/miti-launches-circular-economy-policy-framework-to-promote-sustainable-manufacturing-growth/

[134] Basel Convention Initiatives to Advance the Circular Economy | US ABC. (2023). Retrieved from Usasean.org website: https://www.usasean.org/article/basel-convention-initiatives-advance-circular-economy

[135] UN Plastics Treaty | Global Plastic Laws. (2023). Retrieved from Global Plastic Laws website: https://tinyurl.com/4pa9a5wa

4.1.1. Challenges

A. Lack of a Legally Binding Circular Economy Framework

Despite the adoption of the Framework for Circular Economy by the ASEAN Economic Community (AEC) in 2021,[136] which laid out an ambitious long-term vision in weaving circular economy principles into global economic strategies, the lack of a legally binding framework poses significant challenges to its effective implementation. This absence of a unified framework might lead to the member states developing disparate policies, leading to inconsistencies that hamper regional collaborations. Moreover, this fragmentation might result in inadequate waste management and resource utilization, exacerbating environmental degradation and imposing social burdens, particularly in countries with limited technological and financial capacity to manage waste effectively. For instance, investments could be deterred due to businesses facing uncertain regulatory environments across different countries. As globalization diminishes the constraints of time and space, criminal activities have increasingly transcended national borders, enabling the operations of transnational organized crime (TOC).[137] The absence of a cohesive regional circular economy framework further impedes coordinated efforts to combat challenges such as illegal waste trafficking across the region, slowing the progress towards a safe and sustainable future for ASEAN.

B. ASEAN's Transboundary Waste Challenge: Addressing the Surge in Illegal Imports and Environmental Impact

Transboundary waste refers to the movement of waste materials across national borders, often for the purpose of disposal, recycling, and treatment.[138] In ASEAN, the rise of consumption has led to the surge in waste imports, including significant volumes of non-recyclable and hazardous plastics and electronic waste, exacerbating waste mismanagement. A 2015 study suggested that six out of 11 Southeast Asian countries are among the top 20 countries worldwide for mismanaged plastic waste, including countries like Indonesia, Vietnam, Thailand, Malaysia, and Myanmar.[139] Furthermore, the influx of plastic waste from other countries has also exacerbated the issue of transboundary waste. For instance, the significant increase in imported general waste to Malaysia is a direct result of China's ban on such imports and places a strain on Malaysia's waste management system. As Malaysia has emerged as a global hub for plastic waste exports, countries such as Japan have become large exporters of plastic waste to the nation.[140]

The issue of illegal waste trafficking within ASEAN is complex, involving intricate methods such as mislabeling shipments, falsifying documents, and concealing materials.[141] The lack of a robust monitoring framework renders enforcement capacity insufficient in destination countries, coupled with the difficulty of holding perpetrators accountable. Despite the existence of international conventions such as

[136] ASEAN Frameworks - ASEAN Circular Economy Stakeholder Platform (ACESP). (2023). Retrieved from: https://tinyurl.com/rb44s98v
[137] Viano Emilio C. (2010). Globalization, Transnational Crime and State Power: The Need for a New Criminology. Rivista Di Criminologia Vittimologia E Sicurezza, III-IV(1). Retrieved from https://tinyurl.com/nhfzfxme
[138] Basel Convention > The Convention > Overview. (2024). Retrieved from: https://tinyurl.com/5crjkvma
[139] Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., . . . Law, K. L. (2015). Plastic waste inputs from land into the ocean. Science, 347(6223), 768–771. https://doi.org/10.1126/science.1260352
[140] The Malaysian Insight. (2024). Malaysia global hub for plastic waste exports, says report. Retrieved from: https://tinyurl.com/2rud6pt3
[141] United Nations : Office on Drugs and Crime. (2021). Waste trafficking Southeast Asia. Retrieved from: https://tinyurl.com/mpnmnjt

The Basel Convention that criminalize waste trafficking,[142] the technological disparities and enforcement incapacity remain complex challenges in ASEAN, requiring cross-cutting efforts from ASEAN member states. Addressing these challenges is crucial to safeguard human health, regional stability, and international reputation in ASEAN.

C. Plastic Pollution in ASEAN: Environmental Challenges Requiring Coordinated Solutions

Plastic pollution is a severe issue in both the ASEAN region and Malaysia. As a major petroleum producer, Malaysia has emerged as a prominent source of plastic production due to the petrochemical industry's reliance on fossil fuels as a raw material for plastic synthesis. These plastics are used in a wide range of products, from packaging to construction materials. The production of plastics has led to the corresponding increase in plastic waste in Malaysia.[143] Due to the improper disposal of plastic in Malaysia, marine environments are negatively affected by the leakage of plastic into the environment, to the detriment of wildlife, ecosystems, and contamination of microplastics in bodies of water. Furthermore, plastic contributes significantly to greenhouse gas emissions throughout its lifecycle, from production to disposal.[144]

The concept of sovereignty becomes secondary when addressing environmental hazards within ASEAN. The shared marine environment, characterized by interconnected currents, facilitates the transboundary movement of pollutants, affecting multiple nations within the region. The reality of plastic pollution and its environmental implication is a regional problem that can be felt in every ASEAN member state.[145] It highlights the need for regional cooperation to develop and implement effective policies and strategies regarding plastic pollutants in the region, particularly through waste management infrastructure, resources, and research on waste recovery solutions that are addressed at the regional level. **Addressing the challenge of plastic pollution aligns with the fundamental aspect of a circular economy; contradicting the "take-make-dispose" linear model still prevalent in plastic production and consumption.**

D. Water Scarcity and Flooding: Dual Threats to Water Security in ASEAN

Southeast Asia, including Malaysia, faces pressing and interlinked environmental issues: water shortages, flooding and rising carbon emissions. Rapid urbanization, unprecedented industrial growth, and unsustainable use of resources have exacerbated the symptoms of climate change, threatening environmental stability, public health, and the future of regional economies.[146] Addressing these challenges are crucial as ASEAN moves to an integrated and sustainable future.

[142] Basel Convention > Implementation > Legal Matters > Illegal Traffic > Overview. (2024). Retrieved from: https://tinyurl.com/3p7dvysa
[143] The Edge Malaysia. (2024). Coverstory: The plastic conundrum. Retrieved from: https://theedgemalaysia.com/node/722969
[144] Akhtar, R. - PLASTIC POLLUTION AND POTENTIAL SOLUTION. BERNAMA. (2023). Retrieved from: https://tinyurl.com/4dzrdevr
[145] Eria.org.. Regional Knowledge Center for Marine Plastic Debris. (2024) Retrieved from: https://tinyurl.com/3znbtdeb
[146] Dana. (2024). Water Scarcity in ASEAN: An Urgent Call for Action. Retrieved from: https://tinyurl.com/ym8z8ckj

Water scarcity and excess in the region is caused by irregular rainfall patterns, resulting in both droughts and floods. Extreme weather conditions in Southeast Asia disrupt supply chains and damage water infrastructure, exacerbating water scarcity and triggering floods during the monsoon season.[147] The region faces severe flooding, intensified by deforestation, rapid urbanization, and inadequate infrastructure.[148] On the other hand, the escalating demand for water driven by rapid industrialization also contributes to water scarcity, placing considerable strain on existing water resources and infrastructure. It is estimated that by 2025, ASEAN's urban population will have increased by 70 million compared to 2019,[149] where approximately 49.5% of the ASEAN population, or 326.8 million people, resided in urban areas.[150] Moreover, industrial activities and indiscriminate deforestation have depleted groundwater resources and contaminated water supplies, reducing the availability of clean water in the region. These practices have also led to landslides in mountainous areas and waterlogging in urban centers during rainy seasons.[151]

E. Environmental Implication of Data Centers in ASEAN

As a proponent of ASEAN's digital development, data centers are the infrastructure backbone expected to accelerate to meet the increasing demands for online services, e-commerce, and digital transformation. They serve as centralized hubs for data storage, processing, and dissemination, enabling businesses to operate efficiently and supporting economic growth across the region.[152] However, the expansion of data centers raises concerns about increased energy and water consumption, underscoring the need to support sustainable practices within the industry. The environmental impact of data centers is influenced by the lack of an enabling environment that supports sustainable operations, such as in optimizing water usage. With the right policies and infrastructure, data centers can adopt more efficient and eco-friendly solutions. One article suggests that a 100 MW data center can consume approximately 4.16 million liters of water daily, an equivalent to the daily usage of a city with 10,000 residents.[153] This high water consumption may strain local resources, especially in regions with water shortages. With increased investment into ASEAN's digital economy and the advancement of AI, water management initiatives should work to reduce substantial water usage of data centers, such as to promote the utilization of sustainable water resources and recycled water.

[147] The Edge Malaysia. (2024). Malaysia's water infrastructure must be ready for climate change. Retrieved from: https://theedgemalaysia.com/node/723306

[148] Torti, J. (2012). Floods in Southeast Asia: A health priority. Journal of Global Health, 2(2). https://doi.org/10.7189/jogh.02.020304

[149] Ong, C., Tortajada, C., & Arora, O. (2023). Key challenges to urban water management in ASEAN. In SpringerBriefs on case studies of sustainable development (pp. 3–14). https://doi.org/10.1007/978-981-19-8677-2_2

[150] Ong, C., Tortajada, C., & Arora, O. (2023). Key Challenges to Urban Water Management in ASEAN. SpringerBriefs on Case Studies of Sustainable Development, 3–14. https://doi.org/10.1007/978-981-19-8677-2_2

[151] Unicef.org. (2024). Nearly 6 million children affected as floods and landslides devastate Southeast Asia in the wake of Typhoon Yagi. Retrieved from: https://tinyurl.com/445pnrp3

[152] How Digital Transformation in ASEAN is Driving Data Center Efficiency - ASEAN Center for Energy. (2024). Retrieved from: https://aseanenergy.org/post/how-digital-transformation-in-asean-is-driving-data-center-efficiency/

[153] Sahabat Alam Malaysia. Data centers are big energy and water guzzlers (2024) - Sahabat Alam Malaysia. Retrieved from: https://tinyurl.com/4m957ezv

F. ASEAN's Emissions Crisis Intensified Climate Risks

The region's energy production relies on the burning of fossil fuels, a major contributor to regional emissions, further exacerbating the climate crisis.[154] Notably, five ASEAN countries–Indonesia, Malaysia, the Philippines, Thailand, and Vietnam–contribute to approximately 90% of the region's total greenhouse gas emissions.[155] Furthermore, deforestation driven by the demands of industrialization and agriculture, not only depletes vital resources but also releases substantial amounts of carbon dioxide into the atmosphere.[156] The situation is further complicated by the previously discussed issue of plastic pollution, as improper disposal of plastic waste–including incineration and degradation–releases significant amounts of CO2 into the air.[157] Similar to water shortage and excess, failure to address carbon emissions can result in economic penalties, reduced foreign investments, and adverse health outcomes due to pollution. Addressing these interconnected challenges requires a coordinated regional action that commits to long-term sustainability, embedding sustainability principles early in emerging industries. By incorporating sustainable practices and frameworks from the outset, these industries can avoid costly retrofits, align with global standards, and position themselves as leaders in the green economy.

4.1.2. Key actions

Formalize an ASEAN Circular Economy Framework Agreement (CEFA)

Establish a circular economy framework to harmonize policies, facilitate trade, and promote cross-sector collaboration for sustainable growth and environmental protection across member states.

A key priority for Malaysia as Chair, in USABC's view, should be accelerating the region's transition towards a circular economy by calling for negotiation of an ASEAN Circular Economy Framework Agreement (CEFA), analogous to DEFA. The proposed framework would essentially be a regional initiative aimed at fostering policy harmonization, trade facilitation, and cross-sector collaboration to provide a structured approach to sustainable economic growth while addressing environmental challenges. Several ASEAN countries have each made strides in advancing circular economy principles. For example, Thailand has introduced the Bio-Circular-Green (BCG) Economy Model,[158] which integrates sustainability into economic planning, while Vietnam's National Action Plan on Circular Economy outlines strategic objectives for reducing resource consumption and promoting waste valorization.[159] Building upon existing initiatives and best practices, ASEAN should leverage current frameworks to establish a legally binding instrument on circular economy under the ASEAN Economic Community (AEC) – similar to DEFA. This would harmonize national policies on circular economy, waste reduction, and carbon neutrality goals, and

[154] Asia Pacific – Countries & Regions - IEA (2025). Retrieved from IEA website: https://www.iea.org/regions/asia-pacific/emissions

[155] Amheka, A., Nguyen, H. T., Yu, K. D., Noach, R. M., Viknesh Andiappan, Dacanay, V. J., & Aviso, K. (2022). Towards a low carbon ASEAN: an environmentally extended MRIO optimization model. Carbon Balance and Management, 17(1). https://doi.org/10.1186/s13021-022-00213-x

[156] Grantham Research Institute on climate change and the environment. (2024). What is the role of deforestation in climate change and how can 'Reducing Emissions from Deforestation and Degradation' (REDD+) help? - Grantham Research Institute on climate change and the environment. Retrieved from: https://tinyurl.com/3uztjbwm

[157] Vasahelyi, K., The impact of plastic on climate change. (2023). Retrieved from: https://www.colorado.edu/ecenter/2023/12/15/impact-plastic-climate-change

[158] Birot, V., Thailand's Bio-Circular-Green Economic Model 2024. (2024). Retrieved from: https://lexnovapartners.com/thailands-bio-circular-green-economic-model/

[159] VietnamPlus. (2025). Vietnam embraces circular economy with national action plan till 2035. Retrieved from: https://tinyurl.com/3fjt6zpb

solidify ASEAN's commitment to sustainable development, ensuring consistent implementation of circular economy principles across member states. Malaysia, during the Chairmanship, can streamline the establishment of a regional circular economy framework by forming an ASEAN Circular Economy Task Force to oversee the development and implementation of the CEFA, ensuring alignment with regional sustainability goals.

Foster Regional Adoption of Extended Producer Responsibility (EPR)

Drive sustainable waste management through policy harmonization, trade facilitation, and circular economy principles.

Extended Producer Responsibility (EPR) is a policy that makes producers responsible for the entire lifecycle of their products, encouraging sustainable product design and reducing environmental impact. In ASEAN, several countries have initiated EPR programs to address plastic pollution. For instance, the Indonesian government introduced the **"Roadmap to Waste Reduction by Producers"** in 2019, urging sectors like manufacturing, food and beverages, and retail to submit comprehensive waste reduction plans. Similar to the Indonesian initiative, the Philippines also enacted the **EPR Act** in 2022, requiring companies to meet specific recycling targets for plastic packaging.[160]

To promote EPR in ASEAN, trade policies should be implemented that encourage regional waste management cooperation such as **imposing transition period tariffs** on non-recyclable or difficult-to-manage imports, and facilitating the cross-border movement of recyclable materials. **Implementing a transition period for EPR tariffs is particularly important to encourage a successful regional waste management by providing producers with time to adapt to new regulations, invest in sustainable practices, and develop necessary infrastructure.** This phased approach allows for a steady integration of EPR policies, ensuring that producers can meet recycling targets without undue financial and regulatory strains. This would foster a conducive and collaborative environment where producers, governments, and consumers can work together to promote sustainable waste management practices and a circular economy.

Implementing EPR schemes across ASEAN can significantly improve regional waste management practices and promote the principles of a circular economy. Furthermore, these initiatives have the potential to create a significant number of jobs within the region in recycling, waste sorting, and remanufacturing, contributing to economic growth and social development in the region.

[160] Avery Dennison. (2024). Retrieved from Label website: https://tinyurl.com/bdffrd5a

INDUSTRY LEADING PRACTICE:

COCA-COLA'S PETVALUE PHILIPPINES: PIONEERING BOTTLE-TO-BOTTLE RECYCLING FACILITY

Coca-Cola's PETValue Philippines, a bottle-to-bottle recycling facility, located in General Trias, Cavite, has been operational since 2022.[161] Established through a joint venture between Coca-Cola Beverages Philippines, Inc. and Indorama Ventures, this Philippine Peso 1-billion facility aims to process approximately 2 billion pieces of used PET plastic bottles annually, converting them into 16,000 metric tons of recycled PET resin. With cutting-edge technologies and industry-leading best practices in recycling, PETValue helps in ensuring that PET plastic bottles will be given a new life to be circulated over and over again. This initiative supports a circular economy by ensuring PET bottles are collected, processed, and reused, thereby reducing environmental impact.[162]

Leverage Technology for Regional Waste Management

Foster cross-border collaboration through AI and blockchain innovations to enhance efficiency, transparency, and accountability.

While ASEAN countries share common waste management challenges, such as limited recycling capacities and illegal waste dumping, Malaysia, as the new 2025 chair, can advocate for a cross-border tech-powered waste management framework that facilitates recycling and waste treatment collaborations. In this context, AI and Blockchain are viable technological solutions when it comes to monitoring and tracking waste flows, holding entities accountable in case of illegal waste trade.

Blockchain technology, a secure and transparent digital ledger that records transactions across a network of computers,[163] can be utilized to track the movement of waste, particularly in transboundary waste management. Unlike traditional systems which are vulnerable to mismanagement and fraud, blockchain's immutable records enhance transparency and accountability throughout the entire waste management process. The function of blockchain technology offers a traceable system for documenting each stage of the waste management process, from waste generation to collection, transportation, recycling, or disposal.[164] To effectively implement blockchain technology for regional waste management, ASEAN and Malaysia can establish an interoperable blockchain platform accessible to all ASEAN member states, with data-sharing agreements among participating countries to ensure data privacy and compliance.

[162]
[161] Manila Bulletin. PETValue Philippines recycles 1 billion PET bottles, seeks to forge more partnerships to build on sustainability milestone. (2024) Retrieved from: https://tinyurl.com/mrx84n3d
[163] The Coca-Cola Company. (2022). PETValue Recycling Facility | Coca-Cola PH. Retrieved February 12, 2025, from Coca-cola.com website: https://www.coca-cola.com/ph/en/media-center/pet-value
[164] McKinsey & Company. What is blockchain? (2022). Retrieved from: https://tinyurl.com/y67vy4sw
Bułkowska, K., Zielińska, M., & Bułkowski, M. (2023). Implementation of blockchain technology in waste management. Energies, 16(23), 7742. https://doi.org/10.3390/en16237742

Moreover, AI can play a transformative role in addressing waste management challenges in ASEAN by predicting waste generation, optimizing waste collection routes, and enhancing resource allocation. Malaysia, with its technological expertise, can also introduce an AI-based waste management on a regional level through initiating a pilot project across the borders to demonstrate the effectiveness and efficiency of incorporating blockchain technology into waste management. This would ensure efficient waste collection and recycling while simultaneously formalizing and recognizing its contribution to the circular economy.[165]

INDUSTRY LEADING PRACTICE:

GOOGLE'S CIRCULARNET ENHANCES WASTE MANAGEMENT EFFICIENCY IN INDIA

Taking an example from the industrial sector, Google has developed CircularNet, an open-source machine learning model that primarily leverages AI to enhance waste management processes. In their collaborative measure with Recykal, a digital solutions provider for waste management in Asia, CircularNet has achieved over 90% accuracy in detecting various materials, including metals and different types of plastics. This technological advancement has contributed vastly to the circular economy by optimizing recycling operations, leading to a 60% improvement in quality of production. Operating across more than 30 Indian states and union territories, Recykal's platform facilitates the sale of recyclable materials, diverting approximately 50,000 metric tonnes of waste from landfills each month. This initiative not only enhances recycling efficiency but also contributes significantly to environmental sustainability by reducing pollution and supporting a circular economy.[166]

Promote Local Material Sourcing for Economic Growth and Environmental Sustainability

Strengthen local supply chains to boost regional economies while reducing environmental impact. Sustainably sourcing local materials is gradually gaining momentum as a business practice across ASEAN, with the goal of strengthening local supply chains and economies. Despite the region's abundance in natural resources, many such resources remain underutilized due to inadequate infrastructure, inefficiencies, and limited market demand. By embracing more local sourcing, businesses can drive economic growth and generate employment opportunities.[167]

Adopting a sustainably-sourced local material approach offers numerous low-hanging fruits for ASEAN, particularly in the economic sector, as it paves the way for employment creation, demand generation for domestic goods, and support for local producers.[168] To drive this forward, ASEAN members can establish a framework that focuses on prioritizing sectors with high export potential and domestic value addition, such as electronics, textiles, agriculture, fisheries, and travel.[169] Governments can incentivize businesses to

[165] Siwawa, V. (2024). Effect of the ICT-enabled reclaimer system on the informal waste recycling system in Cape Town, South Africa: The Regenize model. The Electronic Journal of Information Systems in Developing Countries. https://doi.org/10.1002/isd2.12345
[166] CircularNet: How Recykal built Asia's largest circular economy marketplace using Google AI. (2023). Retrieved from: https://tinyurl.com/y2e6yn4r
[167] Asean2023. Leading Resources of ASEAN Member Countries.(2023). Retrieved from: https://tinyurl.com/32k3kuwp
[168] Lim, W. C., McAdoo, M., Ong, G., Nabil Saadallah, Bonar Silalahi, Ow, A., ... Lee, F. (2023). How ASEAN Can Use Its Trade Advantage to Power Ahead. Retrieved from: https://tinyurl.com/ymynu46k
[169] ASEAN. Industry Focus. (2021). Retrieved from ASEAN Main Portal website: https://asean.org/industry-focus/

use locally sourced materials through tax-rebates, subsidies, or preferential procurement policies. Additionally, reducing import dependency enhances supply chain resilience in the face of economic shocks and geopolitical tensions.[170] Environmentally, sourcing locally cuts back on over-exploitation of resources, reduces waste, and lowers carbon emissions from long-distance transport.[171]

INDUSTRY LEADING PRACTICE:

PEPSICO GLOBAL SUSTAINABLE AGRICULTURE POLICY

PepsiCo's Global Sustainable Agriculture Policy outlines the company's commitment to integrate environmental, social, and economic sustainability within its agricultural supply chain. Recognizing the challenges posed by climate change, global food insecurity, and population growth, PepsiCo emphasizes optimizing resource use to improve farm productivity without forsaking soil fertility, water and air quality, and biodiversity. The policy also emphasizes the importance of reducing carbon footprints, supporting local farming communities, and ensuring the welfare of farm animals. The objective of these principles is to achieve a sustainable supply of high-quality agricultural raw materials essential for its products, while simultaneously ensuring strong adherence to the **Supplier Code of Conduct** (SCoC).[172]

In this context, ASEAN can establish **Framework for Sustainable Material Sourcing Guidelines** that implement similar practices: encourage eco-friendly practices, including efficient land use, and sustainable procurement policies.

Malaysia can spearhead the business practice of sourcing locally by setting a fruitful example with its wealth of natural resources and robust industrial capacity. By setting the stage for a more sustainable ASEAN, Malaysia would have to harness its own unique comparative advantages to inspire regional action. For instance, as a leading producer of rubber and palm oil, Malaysia has pioneered certification programs like the Malaysian Sustainable Palm Oil (MSPO) scheme to meet global environmental and social standards.[173] Leveraging its experience with the MSPO, Malaysia can encourage the adoption of comparable certification programs within ASEAN that can significantly contribute to the sustainable development of various industries across the region.

Implement Integrated Water Resources Management (IWRM) for Sustainable Water Resource Utilization

Promote coordinated efforts to address water challenges while enhancing regional resilience to climate change. Integrated Water Resources Management (IWRM) is a holistic approach that promotes the coordinated development and management of water, land, and related resources to maximize economic and social welfare without compromising the sustainability of vital ecosystems. The application of IWRM systems in ASEAN holds significant promise in addressing the multifaceted challenges posed by rapid

[170] SHETTY, J. (202). How Manufacturing & Sourcing From ASEAN Nations Helps Build Resilience. Retrieved from Trademo website: https://www.trademo.com/blog/sourcing-from-asia
[171] Aathaworld. Green Building Materials in Southeast Asia. (2023). Retrieved from: https://tinyurl.com/2s3wj99e
[172] Sustainable Sourcing | PepsiCo ESG | Agriculture & Sourcing. (2023). Retrieved from: https://tinyurl.com/mvjjv79b
[173] MSPO. (2024). MSPO. Retrieved from: https://mspo.org.my/

urbanization, climate change, and increasing clean water demand. ASEAN has demonstrated its commitment to IWRM through several initiatives such as the **ASEAN Strategic Plan of Action on Water Resource Management (ASPAWRM)**. This plan addresses the paramount challenges in water resources, focusing on improving access to safe drinking water and sanitation, efficient water resource management, and supporting integrated river basin management.[174]

Advancing IWRM necessitates collaborative efforts among ASEAN member states. By adopting best practices from within the region, Malaysia can leverage the pre-existing ASEAN platforms to advance IWRM. For example, Vietnam has invested in climate-resilient infrastructure, such as flood control systems and a salinity intrusion barrier (Cai Lon–Cai Be sluice), to mitigate the impacts of climate change on water resources.[175] Salinity intrusion barriers prevent the contamination of seawater into freshwater systems, keeping the water suitable for drinking, and agricultural use. On the other hand, flood control measures such as levees and sluice gates, regulate water flow during heavy rainfall or storm surges, mitigating flood risks to communities and infrastructure. Given the significant portion of Southeast Asia's population (77%) living in coastal areas and low-lying river deltas, these practices are not merely beneficial, but absolutely necessary for the region's resilience to climate change. Malaysia and ASEAN can advance the existing platform to draw inspiration from Vietnam, incorporating similar structural measures to enhance their resilience to flooding and salinity intrusion, ensuring the sustainability of their water resources, safety, and productivity.

Advance Green Infrastructure Development for Sustainable Urban Resilience

Integrate eco-friendly solutions to manage water resources, mitigate carbon emissions, and enhance urban livability across ASEAN.

The development of green infrastructure is a critical step in addressing water shortages and reducing carbon emissions across ASEAN. Green infrastructure combines natural and semi-natural systems into urban areas to manage water resources sustainably, reduce the urban heat island effect, and sequester carbon emissions. This approach simultaneously enhances the livability of urban areas while also contributing to green goals.[176] Features such as rain gardens, bioswales, and permeable pavements help in capturing, filtering, and retaining rainwater, reducing dependency on freshwater sources and mitigating flood risks. In water-scarce regions, implementing large-scale rainwater harvesting systems in a particular area will aid in water supplementation during dry seasons.[177] This is particularly important for regions in ASEAN most vulnerable to drought and sea-level rise, where prolonged dry spells and saltwater intrusion into freshwater sources are significant concerns.[178]

[174] ASEAN Australia Development Cooperation Programme - Regional Partnership Scheme. Association of Southeast Asian Nations (n.d.). Retrieved from: https://tinyurl.com/2p84hz8b

[175] Tran, T. A., & Tortajada, C. (2022). Responding to transboundary water challenges in the Vietnamese Mekong Delta: In search of institutional fit. Environmental Policy and Governance, 32(4), 331–347. https://doi.org/10.1002/eet.1980

[176] Pan, S., Gao, M., Kim, H., Shah, K. J., Pei, S., & Chiang, P. (2018). Advances and challenges in sustainable tourism toward a green economy. The Science of the Total Environment, 635, 452–469. https://doi.org/10.1016/j.scitotenv.2018.04.134

[177] Chandratreya, A. (2024). Sustainable water management through green infrastructure. INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT, 08(10), 1–14. https://doi.org/10.55041/ijsrem37795

[178] Pandya-Wood, R., Azhari, A. Sea Level Rise Is a Clear Threat to Malaysia. (2024). The Diplomat. Retrieved from: https://tinyurl.com/36prd5zy

Vegetation in green infrastructure absorbs carbon dioxide from the atmosphere, storing it in biomass and soil.[179] To address the issue of carbon emissions, ASEAN can promote urban greenery, including parks, and vertical gardens, mitigating urban heat while requiring minimal space.[180] Similarly, green roofs and walls can be implemented to enhance building insulation leading to reduced energy demand for and heating cooling by more than 75%,[181] thereby lowering associated carbon emissions. Additionally, promoting energy-efficient transportation options like electric buses, bicycle lanes, and pedestrian-friendly streets can encourage the use of green transportation, reducing carbon emissions.

By elevating existing frameworks and fostering regional cooperation, ASEAN can create resilient urban environments that support sustainable development. These initiatives will not only enhance environmental sustainability but also improve the quality of life for millions of urban residents in the region.

Champion sustainable data centers for ASEAN's digital future

ASEAN Member States should foster an enabling environment in ASEAN through policy frameworks that promote sustainable, energy-efficient, and environmentally friendly data center operations.

In Malaysia, the growing data center market aligns with the nation's ambition to position itself as a regional digital hub. Malaysia Digital Economy Corporation (MDEC) stated that the country has witnessed an emerging growth in local and international players developing large-scale data centers, as discussed above.[182] As data center expansion accelerates, so does the need for sustainable energy solutions to minimize energy and water consumption. Implementing enabling regulations that promote the adoption of renewable energy and energy-efficient technologies can help ensure that data centers are enabled and supported to operate sustainably while supporting the region's digital growth. Additionally, as an effective regulatory push to promote data centers sustainability, The Green Mark certification, introduced by the Singapore Building and Construction Authority aims to promote energy efficiency, water conservation, and minimize the damage caused by the data centers to environmental well-being.[183] ASEAN can adopt these initiatives, to accelerate the region's progress towards more sustainable data technology practices.

Moreover, ASEAN can consider incentives to encourage sustainable practices among data centers, such as tax rebates and financial subsidies. This approach would help in addressing the challenges of water scarcity and carbon emissions, particularly for emerging markets and multiple industries that rely on these resources.

[179] What's the difference between geologic and biologic carbon sequestration? (2019). Retrieved from: https://www.usgs.gov/faqs/whats-difference-between-geologic-and-biologic-carbon-sequestration#:~:text=Biologic%20carbon%20sequestration%20refers%20to,remove%20CO2%20from%20the%20atmosphere.

[180] BillionBricks. (2023). Green Roofs and Vertical Gardens: Reimagining Urban Housing in SEA - BillionBricks | Net-Zero Homes. Retrieved from: https://tinyurl.com/bdfsnf95

[181] Reducing Urban Heat Islands: Compendium of Strategies Green Roofs Acknowledgements. (2008). Retrieved from: https://www.epa.gov/sites/default/files/2017-05/documents/reducing_urban_heat_islands_ch_3.pdf

[182] MDEC. (2024). Publication - Reports. Retrieved from: https://mdec.my/publications/reports

[183] GMDC: 2024 BCA-IMDA Green Mark for Data Centers BETA VERSION. (n.d.). Retrieved from https://tinyurl.com/45mfpt7a

INDUSTRY LEADING PRACTICE:

AMAZON WEB SERVICES (AWS): AWS CLOUD

Amazon Web Services (AWS) is a leading cloud computing platform committed to delivering efficient and resilient services while minimizing its environmental impact. One key area where Malaysia can leverage industry collaboration is in addressing environmental challenges, particularly water resource management. As part of its broader commitment to sustainability, AWS has pledged to become water-positive (Water+) by 2030, aiming to return more water to communities than it consumes in its direct operations.[184]

AWS has already demonstrated its dedication to water sustainability in Singapore by exclusively using NEWater—Singapore's high-grade recycled water—in its data centers to conserve potable water.[185] Additionally, AWS has implemented advanced cooling technologies to maximize water reuse and partnered with a local startup to pilot implementation of an electrooxidation-based water recycling system, with plans for regional expansion.[186] Beyond infrastructure, AWS actively promotes water sustainability through educational initiatives, STEAM projects, and community engagement activities.[187] AWS received the Water Efficiency Award and Singapore Water Mark Award in 2024 as a recognition for its water sustainability excellence in Singapore.

In parallel, AWS is committed to achieving net-zero carbon emission by 2040, as part of Amazon's broader commitment. All of the electricity consumed by Amazon's operations, including its data centers, was matched with 100% renewable energy in 2023.[188]

AWS is also actively working across the supply chain to develop data centers using lower-carbon concrete and steel wherever possible, including in Southeast Asia. In Singapore, AWS has incorporated low-carbon concrete in data center construction.[189]

By fostering collaboration with AWS and other industry leaders, Malaysia can develop a structured, step-by-step action plan for water resource management across ASEAN. Engaging with stakeholders and ASEAN member states will be crucial in shaping an inclusive and effective leadership framework, ensuring that sustainability remains central to Malaysia's ASEAN chairmanship agenda and the region's long-term digital resilience.

4.2. INTEROPERABLE SUSTAINABILITY REPORTING FRAMEWORK

Sustainability reporting frameworks in ASEAN are evolving, with each member state adopting varying standards to enhance transparency, attract investment, and promote sustainable development in the region. In the Malaysian context, the country has set a commendable precedent by aligning its Sustainability Reporting Framework closely with the **International Sustainability Standards Board (ISSB)** S1 and S2 standards issued in 2022. The launch of the **National Sustainability Reporting Framework (NSRF)** in September 2024 signifies a crucial step in aligning Malaysian sustainability reporting

[184] AWS Makes Water Positive Commitment to Return More Water to Communities Than It Uses by 2030. (2022). Amazon Web Services, Inc. https://aws.amazon.com/local/hongkong/news/water-positive-commitment/

[185] Staff, A. (2024, March 26). 4 ways AWS is innovating on water sustainability in Singapore. SG about Amazon; About Amazon Singapore. https://www.aboutamazon.sg/news/aws/4-ways-aws-is-innovating-on-water-sustainability-in-singapore

[186] Ibid

[187] Ibid

[188] Staff, A. (2024). 4 ways AWS is innovating on water sustainability in Singapore. Retrieved from: https://www.aboutamazon.sg/news/aws/4-ways-aws-is-innovating-on-water-sustainability-in-singapore

[189] Walker, C. (2023). AWS builds data centers with lower-carbon concrete and steel. Retrieved from:https://www.aboutamazon.com/news/sustainability/aws-decarbonizing-construction-data-centers

practices with global best practices. This framework encourages listed companies to adopt the **ISSB** standards for their sustainability reporting. Furthermore, large non-listed companies may be required to comply with the **NSRF**, which incorporates elements of the **ISSB** standards.[190] This alignment facilitates seamless reporting and positions Malaysia favourably in the global investment landscape.[191]

The significance of sustainability reporting in ASEAN is multifaceted. Firstly, transparency in sustainable practices enhances the region's attractiveness to global investors seeking reliable **Environmental, Social, and Governance (ESG)** data.[192] Secondly, adherence to sustainability frameworks strengthens compliance with both local and international regulations, mitigating legal unpredictability.[193] Finally, companies demonstrating a strong commitment to sustainability instantly gain a significant competitive edge in the global market, attracting environmentally conscious consumers and fostering long-term brand value.[194]

In ASEAN, member countries have varying levels of advancement in sustainability reporting, reflecting a mixed adoption of international framework and national-level policies. However, the **Global Reporting Initiative (GRI)** seems to be the most widely adopted framework across ASEAN. The adoption rate for each country ranges from 99% in Singapore, to 65% in Vietnam.[195] Furthermore, many companies and governments in ASEAN align their sustainability objectives with the **United Nations Sustainable Development Goals (SDGs)**, providing a global benchmark of regional reporting. Singapore demonstrates a strong commitment to sustainability reporting, driven by the recognition of climate change as a financial risk to the country's economy and the high focus on **ESG** factors.[196] Factors such as the prioritization of economic development, the need to address pressing social and economic challenges, and limited resources may contribute to lower sustainability reporting adoption rates in some ASEAN countries, such as Vietnam.[197] However, Vietnam is actively working to integrate sustainability principles into its development trajectory.[198]

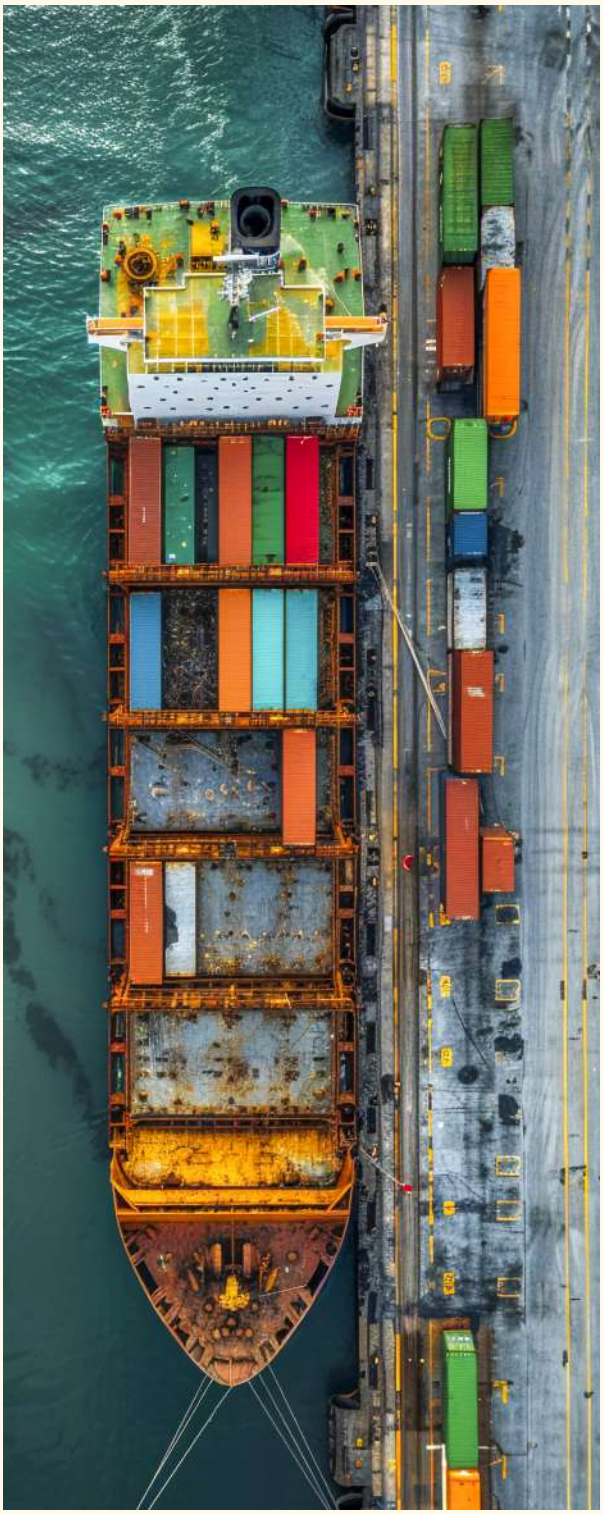
The goal for ASEAN is to develop a harmonized reporting framework that aligns with international standards, such as the Global Reporting Initiative (GRI), while accommodating regional specificities. This interoperability ensures that sustainability reports are comparable across borders and sectors, enhancing their utility for all stakeholders. By providing a common framework on sustainability reporting, these frameworks can encourage companies to innovatively reduce the environmental impact of businesses and pave the way towards a more sustainable future for all.[199] Making sustainability reporting integral to business operations can transform it from a compliance-driven activity into a catalyst for sustainable development. In the broader ASEAN context, this shift is crucial for achieving the region's green and circular economic aspirations, fostering regional resilience, and ensuring equitable growth region-wide.

[190] Securities Commission (2022). National Sustainability Reporting Framework to Enhance Sustainability Disclosures - Media Releases. [online] Available at: https://tinyurl.com/ycxxjfha
[191] Climate Reporting in ASEAN State of Corporate Practices. (2022). Retrieved from: https://tinyurl.com/4hmcxvmj
[192] Enabling sustainable investment in ASEAN. (2025). Retrieved from: https://tinyurl.com/8a6x4kfk
[193] Ibid.
[194] Seneca ESG. (2023). The Role of ASEAN in Pioneering ESG Practices in Southeast Asia. Retrieved from: https://tinyurl.com/4kmzump2
[195] Climate Reporting in ASEAN State of Corporate Practices. (2022). Retrieved from: https://tinyurl.com/3d4k6k6e
[196] KPMG. Singapore Achieves Progress in Sustainability Reporting, Outperforming Global Benchmarks. (2024). Retrieved from: https://tinyurl.com/4bkpbaat
[197] Vietnam Prioritizes Economic Growth in 2024, Striving to Overcome Challenges. (2024). Retrieved from Vietnam Economic Times | VnEconomy website: https://tinyurl.com/3cfnk485
[198] Nguyễn Quân. (2024). Challenges and Progress in Implementing Sustainable Development and Green Growth in Vietnam. https://tinyurl.com/bdfm4kb9
[199] IFRS - IFRS Foundation publishes guide to help companies identify sustainability-related risks and opportunities and material information to provide. (2024). https://tinyurl.com/mtwf7zr2

4.2.1. Challenges

Diverse Regulatory Landscapes Leading to Fragmented Approach

Navigating the diverse regulatory landscape in ASEAN presents significant challenges for businesses, particularly concerning sustainability reporting. Each member state has developed its own set of regulations and standards, reflecting a mosaic of unique economic, environmental, and social priorities. This diversity leads to several complexities:



First, businesses operating across multiple ASEAN countries must navigate a patchwork of regulations, increasing the administrative burden and the risk of non-compliance. Although ASEAN has made significant strides toward an integrated economy through the **ASEAN Economic Community (AEC)**, regulatory differences persist, creating barriers to trade, investment, and cross-border operations. **Secondly, the lack of uniformity in sustainability reporting requirements hampers the compatibility of ESG data across borders,** making it challenging for investors and stakeholders to assess and compare corporate performance regionally. **Thirdly, companies may need to allocate substantial resources to understand and comply with varying regulations, diverting budget and attention away from advancing sustainability in business practices.** This had necessitated an unnecessary increase in staffing to handle complex reporting requirements. **Lastly, as sustainability reporting is a growing priority, the risk lies in countries interpreting and customizing these sustainability reporting standards based on their own specific needs, leading to a fragmented approach.** While the purpose of global standards is to ensure consistency, the customization defeats its purpose. These barriers undermine the quality of regulatory frameworks and harmonization between all the member states and the multinational business community. Addressing these challenges requires a concerted effort from all the ASEAN members towards harmonizing sustainability reporting standards in the region.

4.2.2. Key Action

Promote Interoperable Sustainability Reporting for Enhanced ESG Alignment

Streamline reporting frameworks to improve consistency and reduce redundancies and support sustainable economic growth.

Interoperability, in this context, refers to the ability of different sustainability reporting standards and frameworks to work together seamlessly. This harmonization is crucial for companies operating across multiple jurisdictions, as it simplifies the reporting process and ensures consistency in disclosed information. Taking an example from non-ASEAN actors, the ISSB and the **European Financial Reporting Advisory Group (EFRAG)** have been working collaboratively in aligning their standards, facilitating companies' compliance with both without redundant efforts. In the ASEAN context, ensuring compatibility with frameworks like the **Global Reporting Initiative (GRI)** can provide comprehensive ESG insights and cater to a broader range of stakeholders. The process of achieving interoperability involves aligning definitions, metrics, and disclosure requirements across various frameworks. Subsequently, companies operating in ASEAN will enhance their comparability and reliability of sustainable data for investors and other stakeholders, and reduce their reporting burden. As sustainability reporting becomes increasingly mandatory, the need for interoperable frameworks is more pressing to ensure that data collected is consistent and actionable. Malaysia's strategic alignment with international standards,[200] high adoption rates,[201] proactive regulatory measures,[202] and leadership within ASEAN make it well-suited to advocate for interoperable sustainability reporting standards in the region.

Facilitate Phased Scope 3 Emissions Reporting for Comprehensive Sustainability Practices

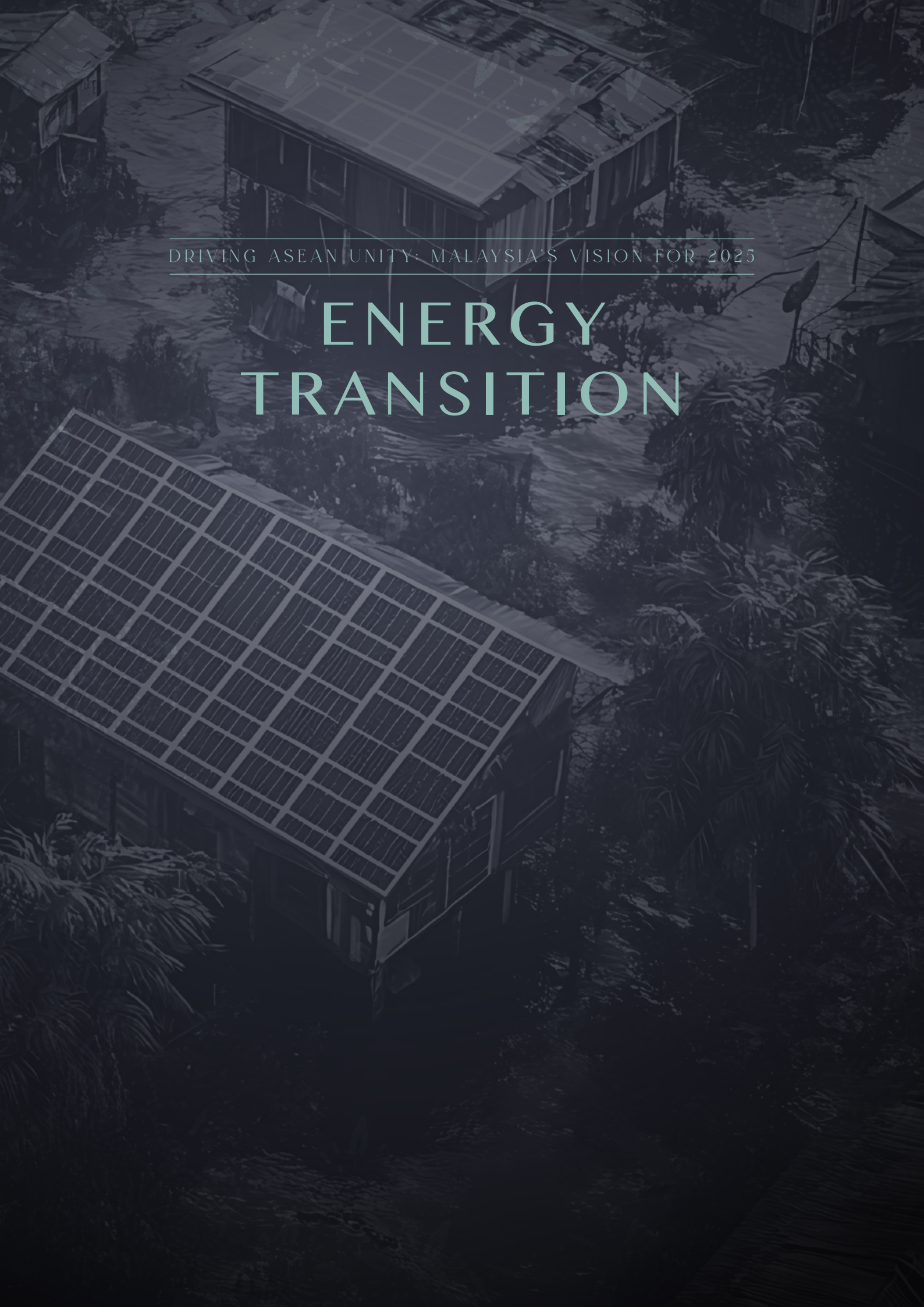
Gradually incorporate indirect emissions into sustainability frameworks to enhance the quality and consistency of Scope 3 emissions reporting.

Scope 3 emissions refers to all indirect emissions that occur in a company's value chain, both upstream (within the company's value chain) and downstream (after the product leaves the company). Examples include purchased goods and services such as raw materials and transportations, and emissions from the use of sold products such as fuel consumption of vehicles. These emissions often represent the largest portion of a company's carbon footprint but are also the most challenging to measure and manage due to their indirect nature.[203] A phased implementation approach enables companies to gradually incorporate Scope 3 emissions reporting into their sustainability practices.

[200] IAS Plus. (2025). Retrieved February 12, 2025, from Iasplus.com website: https://iasplus.com/en/home
[201] GRI - Recognizing sustainability strengths of ASEAN region. (2023). Retrieved February 12, 2025, from Globalreporting.org website: https://tinyurl.com/bdfp4vuh
[202] Lim, E.-L. (2024). Malaysia consults on sustainability reporting framework requirements. https://tinyurl.com/4pyfxerj
[203] Scope 3 Inventory Guidance | US EPA. (2016). Retrieved from US EPA website: https://tinyurl.com/k4xvs3jd

This method acknowledges the complexities involved in accurately measuring these emissions and provides companies with the necessary time to develop robust data collection and reporting mechanisms.[204] To facilitate this transition, the Malaysian sustainability framework, **NSRF**, had provided extended relief periods, allowing companies additional time to develop data collection and reporting mechanisms, thereby enhancing the accuracy of their emissions data over time. The gradual integration helps companies build internal capacities, thereby promoting the quality and consistency of sustainability disclosure.[205] Malaysia's acknowledgement of the complexities involved in measuring and reporting Scope 3 emissions make it well-positioned to provide a model that can be adapted across ASEAN.

[204] Hannig, A. (2024). 5 steps to launch your Scope 3 reduction roadmap. Retrieved from Trellis website: https://tinyurl.com/4b3yjewu
[205] NATIONAL SUSTAINABILITY REPORTING FRAMEWORK. (n.d.). https://tinyurl.com/w9ef44vd



DRIVING ASEAN UNITY: MALAYSIA'S VISION FOR 2025

ENERGY TRANSITION

KEY HIGHLIGHTS

- Energy transition is key to achieving sustainability in the near future. By 2050, ASEAN aims for 63% of its energy mix to be generated by renewable sources, with over one-third of its installed capacity representing low-carbon and carbon-free sources.

- Targeting zero carbon emissions by 2050, Malaysia's National Energy Transition Roadmap (NETR) consists of ten flagship projects that would create 23,000 new jobs and RM25 billion in investments in energy transition sectors such as carbon capture, renewable energy, hydrogen, and green mobility. Key projects and efforts are outlined in the first part of the NETR, while the second half focuses on the energy mix, emission reduction goals, workforce strategies, and international collaborations to support decarbonization and the transition to green energy sources.

- Through the facilitation of cross-border electricity exchange, the ASEAN Power Grid (APG) initiative seeks to establish a connected and integrated regional energy network , enhancing energy security, lowering carbon emissions, and fostering sustainable economic growth.

- Important concerns include the high cost of carbon-free energy, regulatory barriers to the adoption of Carbon Capture and Storage (CCS), and geopolitical conflicts that affect energy transitions. Sustainable energy development in ASEAN will require coordinated regulatory frameworks, creative funding, and sustained government action.

- Tackling economic disparities through tiered carbon pricing, fostering community-level renewable microgrids, providing equitable energy access, and making sure those affected by displacement receive equitable reparations are all needed. Simplifying licensing procedures, enhancing regional cooperation, creating carbon taxation models, and empowering local talent in the energy sector represent a few of the steps being taken to accelerate the transition.

5.1. BACKGROUND

Energy transition refers to the shift from old energy systems dependent on fossil fuels (such as coal, oil, and natural gas) to cleaner, renewable, and low-carbon energy sources (such as wind, solar, hydroelectric, and geothermal energy).This transition aims at reducing greenhouse gas emissions, combating climate change, and offering a secure and sustainable energy future.[206] The level of development of a country and rate of economic growth are two influential factors shaping each society's energy transition journey.

According to a recent report from Powerline,[207] with ASEAN's rapid industrialization and urbanization, regional demand for energy is forecasted to surge even further. While the region relies on fossil fuels to meet this growing demand, greater focus has increasingly shifted to sustainable transition towards low-carbon energy sources coupled with energy security and supporting economic growth and the competitiveness of the region. As of now, over one-third of the region's installed capacity comes from renewable energy sources, a proportion that is expected to rise above 39 per cent by 2025, beating the 35 per cent target for that year *(Energy Transition Roadmap: ASEAN's Focus on Expanding Interconnectivity and Regional Trade, 2024)*. It is anticipated that ASEAN's energy mix will undergo a substantial change over time, with a greater reliance on low-carbon and carbon-free renewable energy sources to generate electricity.

By 2050, carbon-free renewable energy sources like solar, wind, and hydropower are projected to account for 1,742 TWh, or 63% of the energy mix. This would amount to a reduction in the dominance of fossil fuels in 2005 (85.8% of 510 TWh) and 2022 (71.2% of 1,267 TWh). The region's energy and climate goals are the driving forces behind this. By 2050, all ASEAN nations—with the exception of Indonesia and the Philippines—aspire to achieve net zero or carbon neutrality. The Philippines has emission reduction targets but no net zero goal as yet, whereas Indonesia aspires to achieve net zero by 2060.

The ASEAN region, recognized as one of the fastest-growing economies in the world, finds itself at the junction of a significant energy revolution.[208] As the need for energy rises due to urbanization and industrialization, fossil fuels remain the main energy source.[209] Nonetheless, ASEAN's dedication to international climate objectives, such as the Paris Agreement,[210] demonstrates its commitment to move toward sustainable energy systems. The region has enormous potential for the adoption of clean energy considering its abundance of carbon-free resources, including hydropower, geothermal, wind, and solar, and potential advances in battery technology, hydrogen, and other promising sources. However, obstacles like inadequate funding, misaligned policies, and concerns about energy security remain prominent.[211] A balanced and equitable energy transformation requires a concerted ASEAN effort, characterized by regional collaboration and innovation.[212]

[206] S&P Global. (2024, February 24). What is Energy Transition? Retrieved December 19, 2024. https://shorturl.at/MoBzv
[207] Energy Transition Roadmap: ASEAN's Focus on Expanding Interconnectivity and Regional Trade, 2024
[208] IEA (2019), Southeast Asia Energy Outlook 2019, IEA, Paris https://www.iea.org/reports/southeast-asia-energy-outlook-2019
[209] IEA (2024), Southeast Asia Energy Outlook 2024, IEA, Paris https://www.iea.org/reports/southeast-asia-energy-outlook-2024
[210] Verriere, J. (2023, December 14). Power grids and market integration as a milestone for energy security and transition. Enerdata. Retrieved December 19, 2024, from https://tinyurl.com/39jfcud7
[211] Fallin, D., Lee, K., & Poling, G. B. (2023, May). Clean Energy and Decarbonization in Southeast Asia.
[212] ACE (2022). The 7th ASEAN Energy Outlook (AEO7). ASEAN Center for Energy (ACE), Jakarta

5.1.1. Malaysia's National Energy Transition Roadmap (NETR)

The goal of Malaysia's National Energy Transition Roadmap (NETR) is to achieve substantially zero carbon emissions by 2050. On July 27, 2023, part 1 of the NETR launched ten flagship catalyst projects that span six energy transition levers; carbon capture, utilization, and storage (CCUS), energy efficiency (EE), renewable energy (RE), hydrogen, bioenergy, and green mobility. It is anticipated that these major projects will generate over RM25 billion in investment, generate 23,000 new jobs, and lower greenhouse gas emissions by over 10,000 Gg CO_2eq per year.

To make these six focus areas work, there are five factors that are fundamental: government funding and investments, clear rules and policies, human capital and just transition, appropriate tools and facilities, and sound leadership.

INDUSTRY LEADING PRACTICE:

MICRON'S GREEN ENERGY ADOPTION: LEADING THE WAY IN SUSTAINABLE SEMICONDUCTOR MANUFACTURING

In support of the NETR and in close partnership with Malaysian stakeholders such as the Ministry of Energy Transition and Water Transformation, the Energy Commission, and Tenaga Nasional Berhad, Micron Technology's manufacturing operations in Penang and Johor are the first in Micron's global network to run on 100% renewable energy. In this regard, Micron is also Malaysia's largest single subscriber to the Green Electricity Tariff (GET) scheme. Beyond leading in sustainable manufacturing, Micron is also powering the ongoing data and AI revolution through energy-efficient memory products. The data center 6550 ION SSD offers up to 20% better energy efficiency[213] compared to other competing drives without compromising on storage density, decreasing electricity usage and ultimately reducing the environmental impact by reducing the carbon footprints associated with data center operations. This efficiency contributes to ongoing research and innovation in making data centers more sustainable in the future.

Part 2 of the NETR focuses on establishing the energy mix, greenhouse gases (G2G) emissions reduction pathway, and selected targets and initiatives. Investments, workforce strategies, and international partnerships will be enhanced alongside improved policies and regulations to build the talent, technology, and infrastructure necessary for scaling and sustaining decarbonization efforts. Through NETR, the government promotes renewable energy sources, such as solar and introduces carbon capture technologies. Initiatives like the Green Electricity Tariff (GET) further incentivize industries to adopt cleaner energy.

[213] Micron Technology. (n.d.). Micron 6550 ION SSD. Retrieved March 10, 2025, from https://www.micron.com/products/storage/ssd/data-center-ssd/6550-ion

5.1.2. ASEAN Existing Power Grid Projects

Maintaining a disaggregated system of 10 separate grids across the ASEAN region will continue to limit ASEAN's potential, ensuring that energy prices remain high, reliance on other geographies for energy continues, and climate objectives become more difficult to achieve. The lack of sufficient connectivity between abundant sources of affordable, reliable power in the region (such as hydropower in Laos and solar potential in Indonesia) with high energy consuming neighboring markets will continue to challenge the region's leadership potential and ultimately its competitiveness relative to other non-regional economies, particularly for energy-intensive industries, such as AI and data center ecosystems, and advanced manufacturing such as semiconductors. Higher energy prices will also weigh on communities across the region. Disaggregated recognition of renewable energy certificates (RECs) causes a similar challenge to industry, government, and sustainability leaders to reduce carbon emissions in the region.

As the 4th largest energy consuming economy, and with energy consumption expected to rise in ASEAN through 2050, the ASEAN Power Grid (APG) represents an invaluable initiative that aims to build a connected power network across the region, starting with cross-border agreements between neighboring countries. However, progress has been slow, because of regulatory issues, lack of political will, and lack of cross-border financing. Over time, the APG is expected to grow into a sub-regional network, eventually creating a fully integrated Southeast Asia power grid.[214] The APG initiative represents a monumental effort towards energy security and integration within ASEAN – by facilitating cross-border electricity exchange between its members, the APG hopes to strengthen regional energy security, encourage the use of carbon-free energy sources and foster sustainable economic growth.

ASEAN's growing energy demand, driven by rapid economic development and population growth, has highlighted the need for a secure, sustainable, and cost-efficient energy supply. Fossil fuels account for over 75% of the region's energy mix, with coal and natural gas being the primary sources, contributing significantly to the approximately 1.65 billion metric tons of CO2 emissions produced annually by ASEAN countries (ASEAN Centre for Energy, 2023).[215] Acknowledging these barriers, the ASEAN Plan of Action for Energy Cooperation (APAEC) recognizes the APG as a key factor to enable shared electricity between ASEAN members by balancing supply and demand disparities, to accelerate the contribution of renewable energy supplies (RES) such as hydro, solar and wind, and to amplify regional energy security by manifold power supply sources.

[214] Romeo Jr. Abad Arca (2015). ASEAN Power Grid: Enhancing Electricity Interconnectedness.
[215] ACE (2023). Outlook on ASEAN Energy 2023. ASEAN Center for Energy (ACE), Jakarta

Some notable achievements under the APG include the Lao PDR - Thailand - Malaysia Power Integration Project (LTM-PIP) which facilitates multilateral electricity trade (a total of 2.6 GWh electricity had been traded as of December 2021). On top of that, there is also Lao PDR - Thailand - Malaysia - Singapore Power Integration Project (LTMS-PIP) that managed to trade total of 265.73 GWh of electricity as of July 2023.[216] The next achievement can also be seen in the Borneo region; the operational cross-border interconnections in between Sarawak (Malaysia) - West Kalimantan (Indonesia) grid link. Laos also plays an important role in developing carbon-free energy projects, particularly hydropower.

The APG could revolutionize the energy scene in ASEAN by reducing carbon emissions through interconnection of the developing the renewable energy system (RES). The APG can also prompt economic growth by supplying cost-effective electricity to stimulate industrial development and regional trade and by having various energy sources and connecting grids that will enhance the region's capacity in handling supply disruptions. The APG has the potential to be a key component of ASEAN's sustainable energy future by tackling present issues and utilizing local advantages.

The ASEAN Power Grid is a representation of regional cohesion and common aspirations, not only an infrastructural undertaking. ASEAN needs to take more decisive action on the APG to guarantee energy security and prosperity for its citizens by encouraging cooperation, promoting investments, and placing a high priority on sustainability. The APG is an example of international collaboration, showing how a common goal and concerted efforts can produce game-changing resolutions to current global problems.

Malaysia's leadership in ASEAN as both a key interconnecting country and a power generator itself will play a fundamentally important role in turning the APG into a durable reality. Both the LTM-PIP and LTMS-PIP cables traverse Malaysian territory, making Malaysia critical to ASEAN's integrated energy goals to reduce energy prices, reduce carbon emissions, reduce dependency on other markets, and maximize industrial competitiveness while protecting sustainable growth. Without Malaysia's leadership within ASEAN, and ensuring future projects rapidly come online, the APG will continue to struggle to deliver meaningful progress for communities, industry, and the ASEAN economy.

[216] Siem Reap (2023). The Development of the ASEAN Power Grid (APG). HAPUA

5.2. CHALLENGES

5.2.1. The Lack of a Unified Regulatory Framework in ASEAN Hampers CCS Deployment and Green Energy Investment

Energy Trilemma is a phrase that describes the interconnectedness of energy security, affordability and environmental sustainability. These three objectives are often viewed as operating at cross-purposes. To approach the energy trilemma, a delicate balancing act is required and it frequently involves trade-offs. Some of the solutions recommended here or policies advanced may not bear fruit for another 15-20 years, but consideration and engagement on these solutions is vitally important now. At the moment, many companies operating in the region are looking forward to participating in low-carbon emissions projects – to invest and collaborate more with key industry leaders on reducing emissions.

One example is Carbon Capture and Storage (CCS) projects. CCS is a technology designed to durably store carbon dioxide (CO_2) emissions from industrial processes and power generation, thereby mitigating climate change. The CCS process involves three main steps: capturing, transporting, and storing of carbon. To achieve the goals of a net-zero future, a country needs the support of durable, predictable, market-driven policies that will produce the greatest emissions reductions at the lowest cost to society. Predictable policy helps private industry innovate and drive down costs. Sound government policies are needed to accelerate the deployment of key technologies, such as CCS, hydrogen and biofuels, at the pace and scale required to support a net-zero future, while also ensuring actual emissions reduction.

One challenge in exploring CCS is there is a notable lack of research on sustainable financial models to support infrastructure development for CCS projects. Innovative financing mechanisms, such as green bonds and tailored fiscal policies, are essential to bridge funding gaps and promote investment in these technologies.[217] Concerted efforts to bridge these gaps is essential for development of energy transition in this region.

5.2.2. The Lack of Quantified Economic Trade-Off Analysis in ASEAN Hampers Innovative Financing and Carbon Tax Adoption for Carbon-Free Energy

Carbon-free energy sources can be highly expensive compared to fossil fuels. The constraints in handling cost disparities can often be a challenge for many local investors. Furthermore, very few studies quantify the economic trade-offs between fossil fuels and carbon-free energy sources in ASEAN, especially for low-income countries, particularly in comparing carbon-free electricity generation within ASEAN with imports of fossil fuels. Thus, Malaysia as 2025 ASEAN Chair is encouraged to launch studies on how subsidies or innovative financing can foster greater supply of renewable energy in ASEAN.

[217] Ibid.

One additional hurdle which nations also seek to address is formulating mechanisms to create a "market price" for carbon via a carbon tax and or creating carbon trading markets. Devising a carbon tax can be a challenge, and to date only Singapore has effectively implemented a carbon tax. However, aside from Indonesia which is working on a combination of carbon market trading and a carbon tax, the rest of ASEAN member states have been unable to follow suit given issues such as economic inequality and reliance on fossil fuels.[218]

5.2.3. The Lack of Adequate Community Consultation and Equitable Compensation in Energy Projects Hampers Social Stability and Project Implementation

To mitigate negative impacts, it's crucial to prioritize community well-being throughout the entire project lifecycle of a new energy project. This includes conducting social impact assessments, obtaining informed consent from affected communities, and ensuring that local voices are heard in decision-making processes. Furthermore, fair, equitable compensation and resettlement support must be provided for those displaced by the project. Local communities are often not adequately consulted or compensated for the impacts of large-scale energy projects. This can lead to social unrest and project delays. For example, the Xayaburi Dam in Laos has displaced thousands of people and raised concerns about its impact on the Mekong River ecosystem. Compensation has now been paid to those displaced by the $4.47 billion Thai-owned Xayaburi project, with resettlement villages finally built and land distributed to those who lost their land when the dam went into operation.[219]

5.3. KEY ACTIONS

Streamlining Licensing and Creating Investor-Friendly Legal Frameworks to Attract Stakeholders

To accelerate Malaysia's energy transition, Malaysia's government should simplify licensing processes and create investment-friendly legal frameworks that are accessible to the targeted audiences. Malaysia already has the potential to lead the region in carbon-free energy adoption. Micron in Malaysia is recognized by the Energy Commission in Malaysia to run on 100% of renewable electricity, pioneering access to renewable energy in the region as well as setting a model for energy-intensive semiconductor manufacturing operations globally. Malaysia can lead the charge to enable regional shared prosperity by urging fellow ASEAN member states and to work on shared initiatives. **One key initiative would be enabling countries to buy and sell each other's renewable energy sources (RES) through a mutually-acceptable framework for cross-border electricity trading.**

[218] Mariyani, E., & Suciati, R. (2024). Transformation towards the future sustainable: Analysis implementation of carbon tax in ASEAN-5 countries. Educoretax, 4(11), 1365–1379. https://doi.org/10.54957/educoretax.v4i11.1197

[219] Radio Free Asia. (2021, September 29). Lao Villagers Displaced by Xayaburi Dam Still Lack Farmland, Water. Radio Free Asia. https://www.rfa.org/english/news/laos/displaced-09292021174252.html

Strengthening ASEAN Partnerships for Green Energy Integration and Regional Competitiveness

It is essential to strengthen ASEAN partnerships to streamline the flow of green energy and resources. This will advance ASEAN as an energy bloc in order to reduce global dependency and reduce electricity prices. Additional steps are to establish frameworks for cross-border electricity trading and recognition of Renewable Energy Certificates (RECs), to reduce competition between ASEAN state members, and increase competitiveness of the region relative to other geographies.

Promoting Community-Level Renewable Microgrids for Energy Equity and Local Job Creation in ASEAN

Initiatives like community-level renewable microgrids[220] that can serve in remote regions, enhance energy equity and at the same time provide localized job opportunities are promising. Rural communities and underprivileged areas across ASEAN should have access to affordable, carbon-free energy. Large-scale renewable projects must include local distribution infrastructure to prevent disparities. While carbon-free energy offers a cleaner alternative to fossil fuels, some projects have significant environmental impacts. For instance, the Philippines Solar program has installed the largest solar-battery microgrid in the country, providing power to a remote community with enough to support the daytime power requirements of Romblon Island's 43,400 households while also saving about three million liters of fossil fuel and reducing carbon emissions by 6.5 million kilograms per year.[221]

INDUSTRY LEADING PRACTICE:

EMPOWERING ASEAN'S GREEN FUTURE: COLLABORATIVE EFFORTS FOR CCS IMPLEMENTATION

Malaysia's national electricity corporation, Tenaga Nasional Berhad, (TNB) has significantly advanced Southeast Asia's energy transition by exporting renewable energy (RE) to Singapore. Regionally, Malaysia is on the way to positioning itself as a leader in CCS, aiming to establish hubs that can receive CO_2 from domestic and neighboring countries for storage, promoting decarbonization and regional cooperation. The Malaysian government is developing a dedicated CCS legislative framework and has included CCS among the flagship initiatives in the National Energy Transition Roadmap (NETR), with plans for three hubs.[222]

Under the National Energy Transition Roadmap (NETR), Malaysia plans to establish three CCS hubs by 2030, strategically located in Peninsular Malaysia and Sarawak, with a combined storage capacity of up to 15 million tonnes per annum (Mtpa). Looking ahead to 2050, the goal is to develop three additional carbon capture hubs, expanding the storage capacity to between 40 and 80 Mtpa. Regionally, Malaysia's commitment to CCS enhances its role in ASEAN's energy transition. The ASEAN region recognizes CCS as a key enabling technology to decarbonize fossil-fuel power and industrial sectors, essential for meeting climate targets. These initiatives have the potential to position Malaysia as a leader in CCS within Southeast Asia, fostering regional cooperation and contributing significantly to global climate change mitigation efforts.[223]

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CONCLUSION

As Malaysia assumes the ASEAN Chairmanship in 2025, the region stands at a critical juncture where strategic leadership, cooperation, and innovation are essential to shaping a resilient and sustainable future. This white paper highlights five key pillars—Digital Economy, Workforce Development, Healthcare, Sustainability, and Energy Transition—that are fundamental to ASEAN's progress. By addressing these areas with decisive action and policy coherence, Malaysia has the opportunity to lead ASEAN towards deeper regional integration and long-term economic prosperity.

The **digital economy** represents a transformative force that can drive economic growth, enhance connectivity, and position ASEAN as a global technology hub. However, fragmented regulations, cybersecurity threats, and gaps in digital infrastructure must be addressed to create a seamless and inclusive digital ecosystem. Similarly, workforce development remains crucial in equipping ASEAN's labor force with future-ready skills, fostering mobility, and reducing disparities across member states.

Healthcare accessibility and innovation are key to ensuring equitable health outcomes in the face of demographic shifts and rising rates of non-communicable diseases. Strengthening digital healthcare frameworks, enhancing financing mechanisms, and promoting preventive care will be vital for sustainable development.

ASEAN's workforce must be equipped to deal with a rapidly changing economy, requiring public private cooperation and lifelong learning.

Sustainability efforts and ASEAN policy coordination must accelerate to mitigate climate risks, promote circular economies, and enhance environmental stewardship through regulatory alignment and technological advancements.

The **energy transition** is another urgent priority, requiring coordinated action to balance economic expansion with climate commitments. By streamlining policies, fostering regional energy cooperation, and investing in renewable energy, ASEAN can secure its position as a leader in green energy innovation.

This report serves as a call to action for policymakers, businesses, and stakeholders to collaborate in driving meaningful change. In addition, it highlights USABC member companies' capacity to be a constructive part of ASEAN's economic progress. Malaysia's leadership in 2025 provides a strategic platform to catalyze progress in these key sectors, ensuring ASEAN remains competitive, inclusive, and sustainable in the evolving global landscape. Through collective efforts, ASEAN can navigate challenges, seize emerging opportunities, and forge a future that benefits all its member states and their people.

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