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Back Photo: *Local fishermen in Actions on a Tributary of the Mekong River, Cambodia.*
Photo Credit: Say Puthy (2024)

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PHNOM PENH, CAMBODIA

CONTENTS

CAMBODIAN-THAILAND DIPLOMATIC QUAGMIRE: A READER'S GUIDE	13
<i>Dr. Deth Sok Udom</i>	
COO, Paragon Education Company	
Professor of International Relations, Paragon.U	
Senior Fellow, CICP	
CROSS-BORDER DATA GOVERNANCE IN THE GREATER MEKONG SUBREGION: TOWARDS A HARMONIZED DATA MANAGEMENT POLICY FRAMEWORK	21
<i>In Leavsovath</i>	
Master's student, Kobe University, Japan	
TOWARDS AN INCLUSIVE INTERGRATION INTO THE GLOBAL ECONOMY: CAMBODIA'S EMBRACE OF THE FINANCIAL TECHNOLOGY (FINTECH) INDUSTRY	31
<i>Pin Pisey & Pin Reaksa</i>	
Lecturer, School of Business, AUPP & Young	
Global Affairs Graduate, AUPP	
SUSTAINABILITY IN PRACTICE: CASE STUDIES FROM CHAIANG MAI, THAILAND AND POLICY RECOMMENDATIONS FOR THE GMS	43
<i>Dr. Pichayalak Pichayakul</i>	
Assistant Professor, Lecturer, Department of	
Management and Entrepreneurship, Faculty of	
Business Administration, Chiang Mai University, Thailand.	
THE DYNAMIC MODEL OF GREEN PRODUCT INNOVATION: MATERIAL RECOVERY PRODUCT MARKETING TOWARDS RESOURCES EFFICIENCY	55
<i>Dr. Piyanoot Kamalanon</i>	
Lecturer, Department of Management and Entrepreneurship,	
Faculty of Business Administration, Chiang Mai University,	
Thailand	
MIDDLE POWERS PREFERS TO HEDGE IN THE SECOND COLD WAR	67
<i>Henoch Gabriel Mandelbaum</i>	
PhD candidate, University of São Paulo, Brazil	
MULTICULTURE WORKPLACES: HOW CAMBODIANS COMMUNICATE AT WORK	75
<i>Hang Sokunthea</i>	
Lecturer, Department of Media and Communication, Royal University of	
Phnom Penh, Communications Consultant and Researcher	
FROM ROADMAPS TO REALITY: DOES PLASTIC-POLICY COHERENCE RAISE ENVIRONMENTAL INDICATOR SALIENCE IN ASEAN TOURISM?	87
<i>Dr. Siravat Teerasoponpong</i>	
Lecturer, Department of Management and Entrepreneurship, Faculty of	
Business Administration, Chiang Mai University, Thailand	

**DAMS, DISASTERS, AND EARTHQUAKERS:
THE CASE OF MYANMAR AND THE RISKS OF HYDROPOWER IN
EARTHQUAKE ZONE**

101

Tom Fawthrop

**Specialized in covering the Mekong River, and researching
Guest lecturer & presenter at universities in Cambodia, Singapore,
Thailand, and Vietnam**

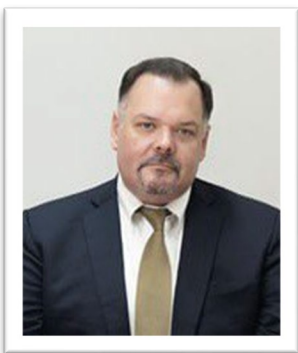
LIST OF BIOGRAPHIES



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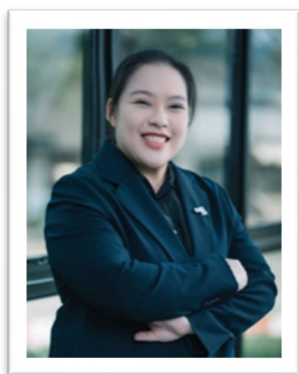
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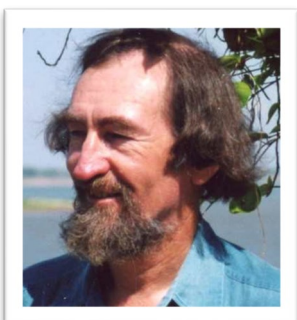


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Sokunthea is a communications consultant, educator, and researcher with over a decade of experience across media, education, development, and the private sector. She began her career as a financial journalist and business researcher, later transitioning into rights-based communications and participatory storytelling. She currently lectures at the Department of Media and Communication at the Royal University of Phnom Penh. Sokunthea has led strategic communication projects for UN agencies, INGOs, and government partners in Cambodia. She holds a Master's degree in Media, Journalism and Globalization from Aarhus University (Denmark) and City, University of London (UK). Her research interests include cross-cultural communication, media and social change, and inclusive education.



Tom Fawthrop

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Guest lecturer & presenter at universities in Cambodia,
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Tom Fawthrop has specialized in covering the Mekong River, and researching the crippling impacts of unregulated hydropower on the ecology of one of the world's great rivers. His works have been widely published in journals and media: The Guardian (UK) newspaper. His Guardian profile and many features on the Mekong published on research gate. Since 2010 he has directed & produced a series of documentaries on the Mekong and in Myanmar. His video reports and films have been screened by Channel 4 UK, Australian ABC, Dutch, Spanish other international film festivals. During the 12 years of monitoring the Mekong I have been guest lecturer & presenter at universities in Cambodia, Singapore, Thailand, and Vietnam.

EDITORIAL INTRODUCTION

This eighth volume of *The Journal of Greater Mekong Studies* arrives at a critical juncture in the evolution of the sub-region. Continuing the tradition of exploring pressing regional issues, this edition widens the analytical lens to include an expanded range of thematic concerns: economic integration, sustainability, technological innovation, cultural dynamics, and regional diplomacy. Each of these themes has become increasingly urgent, as the countries of the Greater Mekong Subregion (GMS) grapple with overlapping transformations in governance, development priorities, and international alignment.

The previous volume emphasized climate change impacts on agriculture and urban systems, underscoring the urgent need for coordinated adaptation and sustainable restructuring. That foundation is extended here with new research that critically assesses how those environmental concerns intersect with broader policy shifts, technological transitions, and socio-cultural complexities.

Dr. Pichayalak Pichayakul's contribution, focused on sustainability practices in Chiang Mai, offers compelling empirical evidence from the field. Through case studies framed by the Circular Economy and Triple Bottom Line approaches, she illustrates the practical integration of sustainability into local enterprise. The article does not simply celebrate these successes, rather it draws attention to persistent challenges such as limited scalability, policy misalignment, and public disengagement, proposing regionally attuned solutions to enhance uptake across the GMS.

Addressing institutional coordination at the ASEAN level, Dr. Siravat Teerasoponpong examines plastic waste policy in the tourism sector. His work identifies key implementation failures despite the presence of regional policy frameworks, arguing for more grounded, stakeholder-driven enforcement and improved mechanisms for transparency and monitoring. This study adds new depth to ongoing debates about regional governance effectiveness and ASEAN's capacity to operationalize sustainability goals.

In a related domain of economic modernization, Pin Pisey and Pin Reaksa offer a forward-looking analysis of Cambodia's financial technology (Fintech) sector. Framing Fintech as a vector of inclusive economic transformation, the authors assess how digital financial tools can expand access to capital, support entrepreneurship, and advance national development strategies. At the same time, their analysis recognizes the underlying infrastructure and policy constraints that must be addressed to prevent uneven digital development.

Turning to cross-cultural dynamics within a transforming labor environment, Hang Sokunthea investigates how Cambodian communication styles in multicultural workplaces are shaped by Buddhist ethical principles and social norms. This analysis contributes directly to improving intercultural fluency within regional organizations, emphasizing emotional regulation and social harmony as tools for conflict avoidance and productive engagement in diverse settings.

Henoch Gabriel Mandelbaum shifts the analytical gaze outward to the strategic positioning of GMS countries within a more polarized global order. His article engages with the behavior of regional middle powers amid escalating U.S.-China rivalry, highlighting the role of hedging and strategic ambiguity. This piece speaks directly to the challenges of regional autonomy and stability in an era of heightened geopolitical contestation.

Dr. Piyanoot Kamalanon explores the drivers of green product innovation in GMS firms, offering a dynamic model that integrates resource-efficiency strategies, marketing acumen, and innovation capability. Her research reveals how firms can convert environmental constraints into competitive advantages, and how regional policy can support this shift toward sustainability-oriented growth.

Finally, also featured in this volume is a special supplement on the Cambodian-Thai border conflict, which provides an up-to-date and deeply contextualized analysis of bilateral tensions that escalated in June 2025.

Together, the contributions in this volume reflect the diversity and depth of current scholarship on the Greater Mekong Subregion. The region continues to navigate a complex convergence of technological transformation, environmental vulnerability, and strategic recalibration. The articles in this edition are united not only by their thematic resonance, but also by their commitment to applied, policy-relevant analysis rooted in rigorous empirical work.

We extend our appreciation to the authors and editorial staff who made this volume possible. It is our hope that the scholarship presented here contributes to the informed dialogue necessary for building a more resilient, inclusive, and cooperative future for the Greater Mekong Subregion.

Bradley J. Murg and Deth Sok Udom
Co-editors

Cambodian-Thailand Diplomatic Quagmire: A Reader's Guide

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Introduction

On May 26, 2025, the Association of Southeast Asian Nations (ASEAN) *launched ASEAN 2045: Our Shared Future*, a forward-looking vision building upon *ASEAN 2025: Forging Ahead Together*. In this new roadmap, member states reaffirmed their commitment to deepening unity, enhancing centrality, and driving a rules-based regional architecture to make ASEAN “the epicentre of growth in the Indo-Pacific region” (ASEAN, p. 9). Yet, ironically, a mere two days later, Cambodian and Thai troops clashed at Chong Bok near the Emerald Triangle, resulting in the death of a Cambodian soldier and igniting renewed diplomatic and security tensions. Online, nationalistic sentiment surged as social media users from both countries exchanged blame, each asserting their nation’s victimhood and accusing the other of violating sovereignty.

In 2017, I contributed a chapter titled “Cambodia–Thailand Diplomatic Relations: From Hostility to Harmony?” where I noted:

Relations between Cambodia and Thailand have been in oscillation between warm cooperation and hostile conflicts since 1950 to the present. Government and regime changes in either Cambodia or Thailand tended to have an effect in the shifts of relations between the two countries. Rather than constantly pursuing nationalist foreign policy and holding on to historical animosity in engaging with each other, elite political forces in both countries conduct bilateral relations based on their strategic interests that bolster their power position domestically. This sometimes entails invoking nationalist rhetoric and “othering” of the neighboring regime to win a sizeable segment of societal support during times of domestic uncertainty, and other times adopting economic and political cooperation with one another when their mutual interests of political stability and economic benefits merge (Deth, 2017, p. 41).

The current episode does not deviate significantly from this dynamic. While each country's narrative framing has its nuances, the prevailing perspectives can be summarized as follows:

The Cambodian View

From Cambodia's perspective, the escalation stems from Thai military aggression in disputed areas. Many Cambodians interpret this as part of a broader Thai ambition to assert historical claims over Cambodian territory. The notion that Thai nationalists are laying claim to Khmer-built temples—erected centuries before Thailand's nationhood — seems both absurd and insulting to Cambodian sensibilities. Consequently, Cambodia has advocated for international arbitration through the International Court of Justice (ICJ) concerning four key disputed sites: Ta Moan Thom, Ta Moan Toch, Ta Krabey, and the Mom Bei areas.

Former Prime Minister Hun Sen, now Senate President, supports the Cambodian government's determination to take the matter to the ICJ as an act of "extinguishing the fire instead of just blowing away the smoke." This position resonates widely among Cambodians. Prime Minister Hun Manet's perspective on this matter is not new. According to a 2008 WikiLeaks cable, in a conversation with then-US Ambassador Joseph Mussomeli, he reportedly "wondered whether Cambodia's patience and low-key approach to Thailand's military incursion into territory long occupied by Cambodia had not been a mistake." The same cable also noted: "Manet argued that it appears that while the initial incursion onto Cambodian soil had not been authorized by the Thai government, that government now saw potential territorial gains from a more aggressive policy regarding border issues" (WikiLeaks, 2008). For Phnom Penh, the ICJ represents the most viable long-term solution, especially given irreconcilable differences in map interpretation.

For the Cambodian administration, the International Court of Justice (ICJ) is ultimately the only mechanism capable of resolving the current dispute once and for all, rather than leaving these areas ambiguous and a potential point of conflict. As Manet pointed out, Cambodia is prepared to accept the ICJ's ruling and move on regardless of the court's decision.

Cambodia's position is firm and rooted in a desire to settle the dispute through international law by engaging external bodies such as the International Court of Justice (ICJ), rather than through bilateral negotiations, due to the belief that little remains to be discussed given the differing interpretations of the maps. On June 10, the Royal Government of Cambodia appointed a high-level Commission to Prepare Documents to File a Case at the ICJ, overseeing two main sub-working groups: Legal Affairs and Diplomatic Affairs. Although Cambodia intends to press its case internationally, it remains engaged in bilateral channels, as demonstrated by its commitment to host the

forthcoming Joint Boundary Commission (JBC) meeting on June 14 to resolve other ongoing border disputes.

The Thai Perspective(s)

There are myriad views among proponents of Thailand, exhibiting varying degrees of hawkishness, but the arguments can be broadly summarized as follows: the tension arises from Cambodia's alleged violation of the "No Man's Land" disputed area despite repeated protests from the Thai side. Accordingly, the Thai military feels compelled to undertake actions to protect the country's sovereignty. On June 7, The Nation published an article describing Cambodia's resolution to take the border dispute to the International Court of Justice (ICJ) as "Hun Sen's nationalist card" aimed at shielding his son from domestic discontent.

For the majority of Thai people, the ICJ's previous ruling in favor of Cambodia's ownership of Preah Vihear in 1962 (including the reinterpretation that the promontory on which the temple sits belongs to Cambodia) has led to distrust of the international institution. Many views the maps as having been imposed on Thailand by the French colonial administration in Cambodia through the treaties of 1905 and 1907. Instead, Thailand prefers to resolve the conflict through bilateral discussions without involving external bodies. For Cambodians, however, this stance is perceived as Thailand's tacit admission that the court would rule in favor of Cambodia.

Unlike in Cambodia, the current issue in Thailand is closely entangled with domestic politics. Thaksin Shinawatra's – and by extension, Paetongtarn Shinawatra's – close ties with the Hun family are viewed, and at times overtly accused, as compromising Thailand's national interests. In response, the Thai Prime Minister stated that while her family's close relationship with Cambodian leaders could facilitate conflict resolution, this does not mean she would "give up her house to a neighbour." Paetongtarn's vulnerable position was openly questioned in a recent Bangkok Post editorial dated June 5, 2025, which accused her of being her father's puppet and soft on Cambodia. The editorial bluntly opens with the remark: "A myriad of problems challenging the country require a strong and competent leader who can rise to the occasion, overcoming adversaries and adversity alike. Sadly, it has become evident that Paetongtarn Shinawatra is unlikely to be that type of leader" (Bangkok Post, 2025).

Hinting at certain segments of the Thai military, Pita Limjaroenrat, former leader of the Move Forward Party, posted a message on Facebook on Monday saying soldiers are for "protecting" the country, not "ruling" the country, and added that "we reject soldiers who "rule" the country – Those who use extra-constitutional power, to carry out coups, interfere in politics, stand over civilians, unduly burden the people's budget, wage information warfare (IO) against the people, and use VVIP power to benefit capitalists both domestically and internationally."

He went on to clarify that “Like all citizens, I am following the situation on the Thai border with concern, but I do not wish to be dragged into responding in a way that fuels tension or conflict further. [...] I believe the public wants to see conflict management that is strategic, knows what's short-term, medium-term, and long-term, understands both sides comprehensively, uses a variety of measures beyond just military ones, and uses it proportionately” (Khaosod, 2025).

As of this writing, uncertainty still prevails over the long-term resolution of the Cambodia-Thailand border dispute. Although both governments recently agreed to reposition troops to avoid direct confrontation and de-escalate tensions, the border issue remains unresolved. In fact, the Thai Ministry of Foreign Affairs confirmed that cutting electricity supplies remains an option, although the ministry spokesperson later clarified that the cut is solely for the safety of citizens and to combat transnational crime, including rampant scam operations, and as a political tool to influence ongoing territorial disputes (The Nation, 2025). In response to the repeated threats, on the late evening of June 12, Prime Minister Hun Manet ordered Cambodia to halt the import of electricity and internet bandwidth from Thailand. Broadcasting of Thai series on Cambodian TV channels and the screening of Thai movies in cinemas have now been banned. Additionally, Senate President Hun Sen urged stronger actions if Thailand refuses to reopen border checkpoints. These measures include suspending imports of Thai goods and seeking alternative export markets for Cambodian products; redirecting patients who seek medical treatment in Thailand to domestic hospitals or medical institutions in other countries; preparing to receive and manage employment opportunities for workers returning from Thailand; keeping all armed forces on full alert to respond and defend in the event of aggression; and being prepared to evacuate residents to safer areas while ensuring the supply of food, medicine, and other essential materials. Nevertheless, he appealed to Cambodians “not to commit extremist acts such as protesting against the Thai embassy, Thai companies, or Thai nationals in Cambodia, and not to harbor racial hatred toward Thai people, most of whom are decent individuals” (Khmer Times, 2025).

With Thailand refusing to accept the jurisdiction of the ICJ and uncertainty surrounding the Court's willingness to accept a unilateral petition, the dispute risks becoming a prolonged regional flashpoint.

In times of heightened tension, it is tempting to be drawn to fiery headlines and polemical commentaries – or worse – fake news and provocations. Accordingly, I encourage our readers to explore recent academic scholarship that offers a stronger historical basis as well as contextually relevant and more nuanced insights about Cambodia-Thailand relations. Below are some of my recommended readings on contemporary Cambodian-Thai relations.

A key contribution to this discourse is *Preah Vihear: A Guide to the Thai-Cambodian Conflict and Its Solutions* by Charnvit Kasetsiri, Pou Sothirak, and Pavin Chachavalpongpun. The authors argue that political elites in both nations have inflamed

nationalist sentiment to distract from domestic issues: The authors argued that “To divert people’s attention from domestic issues, leaders have fanned the flame of nationalism while making enemies across the border. In the process, they have rekindled bitter memories of the historical past to justify their foreign policy toward enemies in the neighborhood, as reflected in the state’s perception of the virtuous self-versus the evil other” (Kasetsiri, Pou and Chachavalpongpun, 2013, p. 2).

In my own book *A History of Cambodia–Thailand Diplomatic Relations, 1950–2020*, I argue that while nationalism and historical grievances do influence bilateral ties, they are not constant drivers. Rather, nationalism is often opportunistically mobilized during periods of domestic political instability or when the neighboring government is ideologically misaligned or perceived as a threat to strategic interests. Moreover, the book presents a comprehensive analysis of Cambodia–Thailand relations during the Cold War and post-Cold War periods — particularly from 1970 to the early 1990s — a phase frequently neglected in existing scholarship and commentary.

Leang Sim Onn, in his dissertation *A Comparative Study of Khmer–Thai Perceptions through Historical Writings*, highlights how both countries’ historical narratives have been shaped by distortion and selective memory, reinforcing mutual antagonism (Leang, 2014, p. ii). Similarly, Kimly Ngoun’s doctoral dissertation, “The Politics of Nationalism in Cambodia’s Preah Vihear Conflict with Thailand: The State, the City and the Border, explores the divergent perceptions among Cambodians regarding the conflict, analyzing “the different bases for nationalist investment in the conflict” through four key explanatory frameworks: the postcolonial nation-building agenda of Prince Sihanouk, the political legitimization strategies of Prime Minister Hun Sen, urban politics of empowerment, and the politics of pragmatism in the periphery. For example, Ngoun (2017) argues that the military dispute with Thailand during this period “spurred the acceleration of nation-building projects, infrastructure development and connectivity in Preah Vihear province,” resulting in spatial and socioeconomic transformations that “have influenced both the older and newer residents to adopt benign views of the Thai–Cambodian border conflict” (p. 189).

In the edited volume *Cambodia’s Foreign Relations*, Morakot Meyer contributes a chapter titled “A History of the Future is Waiting to be Made: Contemplating Thai–Cambodian Relations – A Thai Perspective”, which offers a fresh analysis of authoritarian politics and the politics of memory in Thailand. Meyer argues that “the myth of ‘Pra Viharn’ and the bitterness in Thai–Cambodian relations result partly from ignorance and from the slow development of Cambodian and Southeast Asian Studies in Thailand” (Meyer, 2017, p. 48).

In 2018, renowned Thai scholar Thitinan Pongsudhirak published an article titled “All Quiet on the Thai–Cambodian Front: Drivers, Dynamics, Directions,” in which he explores the strategic necessity of maintaining cordial relations between former Prime Minister Hun Sen and General Prayuth Chan-ocha, despite their ideological and political differences. He attributes this “counterintuitive dynamic” to “the post-coup Thai

government's commitment and resolve to prevail at all costs ahead of the royal succession and the incumbent Cambodian government's weakened political legitimacy at home" (Pongsudhirak, 2018). While Pongsudhirak emphasizes high-level political calculus, my interpretation of this period of cautious cooperation highlights instead the interdependencies of economic development and political stability, as well as the mutual need to foster regime legitimacy in both countries (see Deth, 2020, pp. 173–180).

Most recently, Tita Sanglee, Associate Fellow in the Thailand Studies Programme at ISEAS in Singapore, penned "Doubt and Dissent: Thai Nationalist Views on the Thailand-Cambodia Maritime Dispute" in which she discusses Thai concerns about Koh Kood (or Koh Kut) and the Thai nationalists' suspicion of conflict of interest within Prime Minister Paetongtarn Shinawatra's government regarding maritime negotiations with Cambodia. Specifically, Sanglee details three primary concerns among Thai nationalists: (1) the potential territorial compromise of Koh Kood from Thailand's perspective; (2) perceived imbalances in negotiation frameworks that could disadvantage Thai interests; and (3) alleged conflicts of interest stemming from the Shinawatra family's personal connections to Cambodian leadership. Recognizing these legal and political complexities, Sanglee concludes by advocating for Cambodia's ratification of and adherence to the United Nations Convention on the Law of the Sea (UNCLOS) to facilitate more equitable future resolutions.

As an academic, I hope that people from both sides can come to appreciate the complexities of history and politics and their profound influence on international relations. While it is often tempting to completely dismiss the opposing perspective, we must strive to remain civilized, mature, and cool-headed in addressing such issues. If history teaches us anything, it is that war is profoundly destructive and carries long-term consequences. In a world already unsettled by major power competition, a bilateral conflict would further undermine regional stability and exacerbate the hardships faced by the peoples of the countries involved, especially along the border. Therefore, as fellow ASEAN member states, both sides should be prepared to uphold the commitments they recently pledged in the ASEAN 2045 Shared Vision, which, among other principles, includes the following declaration:

- We remain a rules-based Community of nations committed to the letter and spirit of the Charter of the United Nations (UN), the ASEAN Charter, the Treaty of Amity and Cooperation in Southeast Asia (TAC) and other ASEAN instruments.
- An ASEAN that is a contributor to the maintenance of international peace and security through upholding the rules-based multilateral system and international law.
- An ASEAN with shared commitment to maintaining and promoting peace, security and stability in the region, as well as to the peaceful resolution of

disputes, including full respect for legal and diplomatic processes, without resorting to the threat or use of force, in accordance with the universally recognised principles of international law, including the 1982 United Nations Convention on the Law of the Sea (UNCLOS) (ASEAN, 2025).

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Cross-Border Data Governance in the Greater Mekong Subregion: Towards a Harmonized Data Management Policy Framework

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The Abstract

Greater Mekong Subregion (GMS) is a rapidly growing economic zone, yet its digital transformation is hindered by fragmented cross-border data governance. This policy brief examines the challenges of harmonizing data governance across GMS countries, including regulatory disparities, data localization policies, and varying levels of digital readiness. It highlights the role of regional agreements like the ASEAN Data Management Framework, ASEAN China Free Trade Agreements Upgrade and the Regional Comprehensive Economic Partnership (RCEP) in promoting data flow while addressing security and privacy concerns. The brief also explores the geopolitical influences of China and the U.S., which further complicate regional cooperation. To address these issues, the paper proposes actionable policy recommendations: establishing regional data governance standards, creating a unified cybersecurity framework, fostering public-private partnerships for infrastructure development, and investing in workforce training for data and cybersecurity. By prioritizing these measures, the GMS can enhance cross-border data flows, support economic integration, and build a resilient digital economy. This paper will underscore the urgent need for harmonized data governance to unlock the GMS's full digital potential.

The Greater Mekong Subregion (GMS) has foreseen as one of the prominent regions of economic growth compared to other regions. The region encompassed 326 million people from six different countries included People Republic of China (PRC), Cambodia, Laos, Myanmar, Thailand and Vietnam. Since early 1990s, GMS economies shown a remarkable annual growth rates to nearly 8% per year, especially the region of GuangXi and Yunan Province PRC is at the highest level, while other mainland Southeast Asia experience a growth of 4%-8% (Asian Development Bank, 2012). However, based on World Bank and International Monetary Fund (IMF), Asia-Pacific region included GMS experience a growth of 4.6% in 2023, but also declined to only 4.2 to a slowdown in productivity within China and the ongoing recovery efforts of other GMS nations, such as Thailand and Vietnam (World Bank , 2024).

In response to these economic dynamics, the GMS countries committed to its GMS Economic Cooperation Program Strategic Framework 2030 (GMS-2030) by pursuing digitalization which aims to enhance digital economy and fostering economic development of their respective countries. GMS Program initiated and supported by Asian Development Bank (ADB) with the financial assistance of \$5.9 billion from 2020-2023 on sectors like agriculture and natural resources, trade investment, tourism etc. GMS Digitalization Action Plan. As a result, to optimize the allocation of funds for more efficient use of development, ADB engaged in extensive research with relevant countries and formulated the GMS Digitization Action Plan (2025-2027). This plan designed for GMS stakeholders to implement to advance digital innovations, improve infrastructure and literacy, and enhance human resources productivity, broaden trade and investment, market opportunities in a sustainable manner (Asian Development Bank, 2024).

Importance of Cross-border Data Flows

The digitalization of the economic sector encompasses multiple dimensions that play a significant role in fostering growth, particularly in the realms of trade and investment. The GMS Digitalization Action Plan (2025-2027) identifies various challenges related to digitalization encountered by the GMS countries, one of which pertains to trade and investment: the lack of coordinated approaches to cross-border trade, commerce, and data movements. Given that digitalization contributes to cross-border interoperability, the facilitation of data flows is essential for advancing global communication, operational business frameworks, supply chains efficiency, and electronic logistics, as supported by the OECD (n.d.).

Furthermore, the enhancement of cross-border data flows is correlate with a decrease in trade and transactional costs, an elevation in business productivity, and an increase in export capacities for larger enterprises (Pepper et al., 2016). In light of its significance, it is imperative that cross-border data flows be systematically governed to ensure effective storage, analysis, sharing, and protection of data related to cross-border economic activities (OECD, n.d.).

In examining the GMS Digitalization Action Plan (2025-2027), the initial entry point of planning and strategy of the GMS Digital Trade Strategy 2030 articulates the anticipated adoption of data governance guidelines aimed at modernizing a standardized e-commerce platform across member countries, thereby aligning regional regulations. Nevertheless, it should be noted that this action plan was only ratified in November 2024, with limited milestones reported. Consequently, the establishment of a harmonized policy is deemed necessary to adequately address and respond to both current and prospective challenges.

Cross-Border Data Governance Landscape of GMS Countries

Variations of data governance practice are very common among GMS countries due to the absence of complementarity in the intimate policies regarding data governance. The structure of data protection is conceptualized in two pictures: domestic data flow regulation and cross-border data flow regulations (Watanabe et al., 2025). However, to gain deeper understanding of the regulatory gaps and the importance to cross-border interoperability, the table below specifically outlined cross-border data flow regulations, as categorized by the world bank taxonomy of data flow model.

Table 1: Cross-border Data Flow Model of GMS Countries

	Limited Transfer Models			Conditional Transfer Model	Open Transfer Model
	Regulatory Safeguards			Regulatory Safeguards	Regulatory Safeguards
Regulatory Option	Local Storage	Domestic Processing	Government Approval		
Key Features	Broad requirements to use domestic	Broad requirements to use domestic servers for data processing	Prior approval is required for data transfer	<ul style="list-style-type: none"> • Consent • Adequacy findings • Private sector assessment 	<ul style="list-style-type: none"> • No a prior mandatory requirements • Private sector accountability based on voluntary standards
Countries					
Cambodia	<ul style="list-style-type: none"> • Draft Personal Data Protection Law (not yet enact) • Draft Cybersecurity Law (not yet enact) 				Cambodia Law on E-commerce (2019)
China	<ul style="list-style-type: none"> • Cybersecurity law (2017) 		<ul style="list-style-type: none"> • Personal Information law (2021) • Data Security law (2021) 		
Laos				Draft Personal Data Protection Law (not yet enact)	The Laos E-Commerce Decree (2021)
Myanmar			Cybersecurity law (2025)		

Thailand				<ul style="list-style-type: none"> • Personal Data Protection Act (2022) • Cybersecurity Act (2019) 	
Vietnam			<ul style="list-style-type: none"> • Law on Cybersecurity (2018) • Personal Data Protection Decree (2021) • Draft Data Law (not yet enact) 		

Source: Based on a Diagram from World Bank Report 2021: Data for Better Lives.

Based on the above table, certain countries like Vietnam and China have regulation that restricted the share of data and prioritize data localization. In contrast, some nations like CLV (Cambodia, Laos, Vietnam) have yet fully establish comprehensive cross-border data law. The concept of data connectivity is how these countries are involved in multilateral trade agreements such as in the ASEAN Agreement on Electronic Commerce, which despite its non-binding provision of cross-border data issues, they seek to create conducive environment for data driven economic growth (Chen, 2020).

Relevant Regional Agreements and Frameworks related to Cross-border Data Governance Between GMS Countries

A more comprehensive cross-border data governance could be seen in many ASEAN regional agreements and frameworks. ASEAN Data Management Framework (ADMF) stood out as a significant policy instrument that prioritizes cross-border data flows mechanism with less restriction, seamless flow of data and support inter-company and intra-company to join as “Trusted Data Partner” in sharing and leveraging data to gain a successful business outcome (ADGSOM, 2021). Furthermore, the ASEAN Agreement on Electronic Commerce recognizes the necessity of cross-border data transfer on the information for business purpose, but subject to national law ensuring the safeguard and security of the flow of information (AEC, 2015). This agreement serves as a foundation to the newly proposed ASEAN Digital Economy Framework Agreement (DEFA) which intends to cover more about cross-border data flows and data protection as one of the core provisions. ASEAN DEFA aims to strengthen the free flow of commercial and non-sensitive data, exempting it from localization requirements unless dictated by legitimate public policy objective. However, this agreement is yet to be ratified due to ongoing negotiations.

While those mentioned agreements and frameworks primarily address for ASEAN member states, cross-border data governance mechanism that involve China can only be found in Regional Comprehensive Economic Partnership (RCEP) and ASEAN-China Free Trade Agreement (ACFTA) 3.0 upgrade negotiations. Similar to ASEAN DEFA, RCEP does not impose restrictions on cross-border transfer of information by any electronic means, but it still retains their regulatory provision for certain types of data (ASEAN, 2023). In addition, ACFTA that includes Digital Economy Chapter, mirrors these provisions and encompasses general stipulations along with specific guidelines for distinct data flow categories. Each participating party is prohibited from obstructing the electronic transfer of information, with an expansion of clauses allowing for similar exceptions. Most of GMS countries like Cambodia, Lao PDR, Myanmar and Vietnam will not be obliged to the comply with the above information until 1 January 2027. It notably encapsulated that ASEAN and China reliance on these agreements would reflect the effort to establish a harmonized regulatory framework, enhance effective of their data practices (Chen et al, 2024).

As an economic powerhouse, China also introduced initiative such as Belt and Road Initiative (BRI) where one of its components called Digital Silk Road (DSR), play a vital role in promoting artificial intelligence capabilities, cloud computing, e-commerce, technology for cross-border collaboration (Council Foreign Relations, n.d). Through this initiative, China has more transitional impact on data governance across border with strategic partnerships often contingent upon Chinese technological investments. Unfortunately, the discussion of data sovereignty and cybersecurity concern remains critical discussion till these days (Erie, & Streinz, 2021). GMS countries would get opportunity to experience a cyber governance system that supported by China, as evidence from Vietnam imposing regulations on data storage on Google and Facebook prior to the transfer their customers data to the governmental authorities (Harding, 2019). As a result, the Mainland Southeast Asia are navigating a complex framework that intertwines ASEAN initiatives and Chinese regulations, presenting notable challenges for GMS countries.

Key Challenges to Data Governance Harmonization

Regulatory Fragmentation and Data Localization Policies

Key challenges to the harmonization of data governance manifest in several dimensions. First, regulatory fragmentation and data localization policies significantly impede alignment with national and regional frameworks. Despite existing provisions such as those outlined in RCEP and ACFTA regarding the legitimacy of data flow restrictions, countries like Vietnam and China continue to require domestic and certain foreign entities to maintain localized storage of personal data, thereby imposing increased operational costs on foreign businesses (Fox, 2022; Erie & Streinz, 2021). Cambodia with the open transfer model for ecommerce law, still prioritize the requirement of data localization stipulating limited access as per the new draft cybersecurity and data protection law aligned with the General Data Protection Regulation (GDPR), eliciting concerns over data

scrutiny by companies (Hongseong, 2023). Myanmar also proposed to draft a law for data localization and retention with the risk of companies to hand over sensitive information to the government (MCRB, 2022). In contrast, only Laos and Thailand do not impose data localization requirement, although cross-border data transfer of personal data is deemed necessary for some approval based on their respective regulations (Sangfor Technologies, 2023).

- **Network Readiness Gap**

Secondly, the lack of digital readiness also contributes to cross-border data governance among GMS countries. Significant gaps like digital infrastructure and capabilities exist, hindering cooperative efforts and presenting barriers to effective governance. The Network Readiness Index provides a quantitative measure of digital readiness across various pillars, as outlined in the following table, which excludes Myanmar due to data limitations.

Table 2: GMS Countries Network Readiness Index Score

	Cambodia	China	Laos	Thailand	Vietnam
Rank	110	17	108	40	45
Network Readiness Index	35.65	68.70	36.36	56.07	54.96
Governance Pillar	27.96	73.81	28.23	71.32	58.03
<ul style="list-style-type: none"> • Trust • Regulation • Inclusion 					
Technology Pillar	27.96	65.34	30.32	47.05	49.27
<ul style="list-style-type: none"> • Access • Content • Future Technologies 					
People Pillar	33.64	66.33	32.12	50.49	47.97
<ul style="list-style-type: none"> • Individuals • Businesses • Governments 					
Impact Pillar	44.38	69.32	54.79	55.41	64.58
<ul style="list-style-type: none"> • Economy • Quality of Life • SDG Contribution 					

Source: Network Readiness Index (2024), Portulans Institute
Score: 0-100, Ranking is out of 133 countries

The data indicates that Laos and Cambodia, except for Myanmar, are lagging in digital readiness compared to Thailand and Vietnam, particularly evident in their governance capabilities. China leads significantly in technological advancement, establishing itself as a powerful influencer within the GMS region (Dutta & Lavin, 2024).

Geopolitics and Overlapping Frameworks

Finally, a little discussion on geopolitics is how common rules that enable cross-border data flows and banning data localization are somehow driven by the US interests, positioning them unfavorably against Chinese regulatory policies. This dynamic presents challenges for China's Personal Information Protection Law (PIPL) and its Digital Silk Road initiative. Consequently, China engaged in RCEP and ACFTA discussions, which offer flexibility in general data transfer and localization mandates through country-specific self-assessment (Strienz, 2021). Moreover, China and Vietnam cross-border data regulation also challenged the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) due to free flow restriction and concern on cybersecurity legislation (Fox, 2022). Moreover, ASEAN, with many free trade agreements, result in overlapping provisions that undermine the efficacy of commitments made by member nations. In light of these complexities, GMS countries are encouraged to prioritize the GMS Digitization Action Plan (2025-2027) to advance a harmonized framework for data management.

Policy Recommendations

- The process of harmonization within GMS is of significant importance for the enhancement of international cooperation and the facilitation of sustainable economic growth. The effective implementation of this cooperation necessitates strong commitment from the countries involved. Currently, while GMS nations are engaged in cooperative efforts regarding the digital economy and have initiated cross-border data governance activities, the introduction of additional policies is essential for the seamless operation of these initiatives.
- Establishing Regional Standard for Data Governance: GMS countries must undertake the initiative of creating uniform data protection legislation and mechanisms for facilitating cross-border data flow. These frameworks should adhere to existing international standards, such as those set forth by ASEAN or UNESCAP, while also undergoing modernization to align with shared objectives that promote the unrestricted flow of information. In terms of data localization, countries should consider implementing standards or conditions that mandate specific data approvals, thereby ensuring that operations across national borders do not adversely affect business activities within the GMS.
- Establishing a Regional Cybersecurity Framework to Build Trust and Resilience: Although some nations have enacted cybersecurity laws or are in the process of drafting such regulations, a unified regional framework remains necessary. This framework would safeguard data sovereignty,

allowing businesses to operate effectively without encountering technical challenges or the risk of data scrutiny.

- **Encouraging Public-Private Partnership to Invest in Data Centers:** Given the high costs associated with regional cloud coordination and cross-border data management, GMS governments should actively seek private sector investments to support this infrastructure development. Such partnerships would not only enhance operational security for businesses but also ensure governmental facilitation in these endeavors.
- **Enhancing Workforce Readiness in Data and Cybersecurity Field:** The GMS nations must invest in training programs or develop national strategies aimed at promoting e-commerce, cybersecurity, and data science as vital components for national advancement.

All of these policies undoubtedly necessitate the support of international institutions, which play a critical role in providing funding and technical assistance for international cooperation efforts. ADB continues to be instrumental through its published action plans, while GMS countries should also engage with relevant international organizations such as the International Telecommunication Union (ITU), ASEAN, and UNESCAP to leverage their expertise and further strengthen the suggested policy frameworks.

Conclusion

In conclusion, the significance of cross-border data governance is very essential in the context of trade and investment within the current digital landscape. The embrace of digital economy fosters a seamless business operation across the border, facilitating extensive economic and technological growth. However, challenges stemming from regulatory fragmentation and gaps in digital readiness must be addressed. Enhanced mutual cooperation, alongside the support from international institutions for both financial and technical resources, is essential for nurturing a resilient, inclusive, and sustainable digital economy.

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Towards an Inclusive Integration into the Global Economy: Cambodia's Embrace of the Financial Technology (Fintech) Industry

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Abstract

As the world rapidly moves into the digital future, countries of the Greater Mekong Subregion (GMS) are urged to consider strategies for their integration process into the global economy for the next decade. Whether through sectoral diversification and or upgrading approaches, GMS countries must move up the global value chains and be able to engage in highly complex economic activities. For one, the rising trend in financial technology (Fintech) adoption around the globe, and especially within Southeast Asia, presents a timely opportunity for emerging countries like Cambodia, whose economy remains heavily reliant on a limited range of sectors and low-complex activities, to build a more complex financial service subsector and leapfrog with technology adoption. Correspondingly, this article discusses the impacts of the Fintech industry on emerging economies and its role as a pivotal subsector for driving Cambodia's economic transformation and integration into the global market. It also highlights the ongoing challenges and policy areas to consider for Cambodia's safe embrace of the Fintech industry.

Keywords: Financial Technology (Fintech), Emerging Economy (Cambodia), Greater Mekong Subregion (GMS), Economic Integration Strategy, Sectoral Diversification

Introduction

Geographically linked by the Mekong River, the six countries of the Greater Mekong Subregion (GMS), constituting Cambodia, Lao PDR, Myanmar, Thailand, Vietnam, Yunnan Province, and the Guangxi Zhuang Autonomous Region in China, share common objectives for sustainable development and economic growth. Coming together since 1992, the GMS has embarked on an economic cooperation program with the Asian Development Bank (ADB) and other development partners, making substantial progress towards regional economic integration in the last three decades on focusing areas including infrastructural development and physical connectivity, goods and peoples'

mobility, trade and investment facilitation, information and technology, energy, environment, agriculture, and human resource development (GMS Secretariat, n.d.). Going forward into 2030 and beyond, it is apparent that the further integration of the subregion into the global economy, which is rapidly undergoing the Fourth Industrial Revolution (4IR), would require the member-states to strategize moving up the global value chains (ADB, 2021). Recommended options include upgrading and diversifying the sectors of their prospective economies to be able to produce more complex, value-added products and services, meeting the demands of the rich-world markets, as well as attaining higher wages and specialized skills for their workforce (ADB, 2021).

Following the ADB's analysis, the GMS countries are diverse from one another in terms of their economic structure and export specialization (ADB, 2021). While China, Thailand, and Vietnam have achieved structural diversification, Cambodia and the others have yet to diversify their economic structure (ADB, 2021). Besides a narrow economic base, for employment and growth most GMS countries rely heavily on sectors with less complex activities associated with lower income, such as agricultural activities and tourism services (ADB, 2021). As it currently stands, Cambodia's key industries are textile and garment manufacturing, tourism, agriculture, construction, and real estate (Aun, 2024, as cited in Khmer Times, 2024). Therefore, emerging countries such as Cambodia are urged to pursue a diversification strategy in the variety of goods and services produced, as well as opportunities to upscale current growth sectors by capitalising on potential sub-sectors to involve more highly complex activities, for instance, in business and financial services (ADB, 2021).

Picking up on the suggestive premise of venturing into financial services, this article takes note of the rise and boom of the financial technology (Fintech) industry around the globe and in Southeast Asia, where analysts strongly see emerging economy as a lucrative epicenter and entering a 'golden age' (Fintech News Singapore, 2025a) as the region's digital economy is projected to hit \$1 trillion USD by 2030 (SEADS, 2021). Indeed, with local and international demands for innovative digital financial services surging, the Fintech industry, which is still relatively small and nascent in Cambodia compared to leading Fintech hubs in the region such as China, Singapore, Thailand, and Indonesia (Khmer Times, 2023; Digital Economy and Business Committee, 2023), presents a striking opportunity for the country to attract investments and upgrade its financial services sector into a robust economic growth driver. Furthermore, Cambodia's embrace of Fintech has the potential to address several other cross-cutting issues such as innovation and digital transformation efforts, financial inclusion, financial stability, efficiency (Digital Economy and Business Committee, 2023), and sustainability to support its aspirations of becoming a high-income developed country by 2050. This article primarily explores the Fintech industry's potential for emerging economies to upgrade their financial services sector. It specifically examines the state of the Fintech Industry in Cambodia and its role in transforming the financial landscape and economy. It also looks at the challenges and policy areas to consider for Cambodia to soundly embrace the industry.

Importance of Financial Sector Development

As the old adage goes, 'money makes the world go around,' finance is the bloodstream of the economy, allowing for personal, institutional, and public transactions to take place. Acting as an intermediary for the operation and performance of other sectors, the financial services sector provides at least five core functions for the economy, enabling 1). Payments for the exchange of goods and services and liquidation of assets, 2). Access and intermediary transfer of capital between savers and borrowers, 3). Production of financial information for investors to make decisions on capital allocation, 4). Monitoring and enforcement of financial contracts, and 5). Pricing and allocation of financial risks (World Bank, n.d.-a). However, traditional banking providing these services does come with processing costs, such as in making transactions, acquiring information, and enforcing contracts, as well as time delays and limited physical access, which are significant barriers for users (Bachas et al., 2018). For emerging countries, further financial sector modernization and development are encouraged to help reduce transaction inefficiencies, cut down costs, promote inclusive access to financial services, and stimulate a competitive business environment, overall contributing to economic growth (World Bank, n.d.-a).

a. Merits of Fintech Adoption for Emerging Countries

An instrument for modernization, financial technology (Fintech) is now generally understood as the adoption of digital technologies to provide innovative solutions for enhancing the access and delivery of financial services for users (UN, 2023). Examples range from computer and mobile apps for basic banking activities, such as instant access to bank accounts, credit/debit cards, and transfer of payments and loans, to other areas including software applications for crowdfunding, managing personal finance, investment, and insurance. Although the development of Fintech has emerged in the Global North since the 1800s with the invention of information transmission technologies, marking the era of Fintech 1.0, the world is observed to have now reached the era of Fintech 3.5 (2014 - present), where Fintech has become globalized and is rapidly being adopted by developing countries to overcome barriers of the traditional banking system (UN, 2023).

Following this phenomenon, several cross-country studies have since unveiled the favorable interplay of Fintech adoption and growth for developing economies. According to an ADB study with evidence from 25 developing economies in Asia, Fintech impacts inclusive growth by promoting financial inclusion, as these economies tend to encompass a large proportion of the underbanked population (Parvez et al., 2023). Digital solutions, especially mobile banking have become prominent, making formal financial services such as means of payment and money transfer, credits, loans, remittances, and cross-border payments, more accessible and affordable, especially for the low-income underbanked populations in remote areas, thus allowing them to participate more fully in economic activities and wealth accumulation (Frost, 2020; Parvez et al., 2023). Likewise, as realized during the Covid-19 pandemic, Fintech has become an indispensable policy medium for

keeping up access to financial services and governmental relief efforts in times of disruptive and uncertain situations (World Bank, 2020). Furthermore, financial inclusion, as recognized by the World Bank, is a driver of sustainable economic growth with effects to advance seven of the United Nations' 17 Sustainable Development Goals (SDGs), including poverty eradication (SDG 1), hunger elimination (SDG 2), betterment of health and well-being (SDG 3), economic empowerment of women and gender equality (SDG 5), promotion of entrepreneurship, decent job creation and growth (SDG 8), support for industry, innovation, and infrastructure (SDG 9), and reduction of inequality (SDG 10) (Yap et al., 2023).

b. Common Pitfalls to be Addressed

Despite the financial barrier-breaking promises, developing countries still face a multitude of paradoxical factors constraining their capacity to effectively and soundly embrace Fintech. Common concerns raised by researchers and industry analysts are (i). the lack of digital infrastructure and talent gap to operate the services, (ii). the underdevelopment of national and region-wide regulatory frameworks, (iii). the low financial and digital literacy rate among users, (iv). the low trust and socio-cultural preferences for cash transactions due to the digital divide between different groups of the population (especially among the elderly, low-income individuals, women, and minority groups in remote areas), (v). data protection and cybersecurity issues, and (vi.) potential implications of Fintech practices on the stability of the financial system (Imam et al., 2022; Mahaseh, 2023; Kwon et al., 2023; Cevik, 2024).

With the general trends on the implications of Fintech adoption for developing countries laid out, the following section discusses closely the state of the Fintech sector in Cambodia.

The State of the Fintech Industry in Cambodia

Amidst the strong growth trajectory of the Fintech industry in Southeast Asia, which attracted over \$6.3 billion worth of investments alone in 2022 (Fintech News Singapore, 2025b), Cambodia's market, standing at 4% in terms of the total number of Fintech firms operating in the region (Digital Economy and Business Committee, 2023), is still relatively small, but rapidly growing. As figuratively assessed by the government (see Figure 1), the state of Cambodia's Fintech sector is that of a tree sapling, not entirely lagging, but hasn't yet grown to maximize the benefits (Digital Economy and Business Committee, 2023).

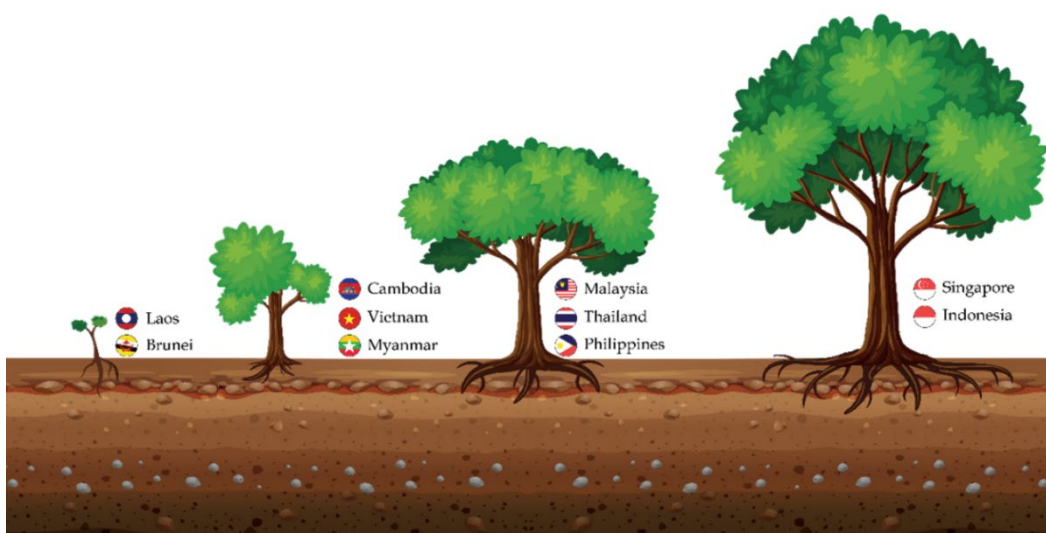


Figure 1. Comparison of FinTech Development among ASEAN Countries. From “Fintech Development and Landscape,” by the Digital Economy and Business Committee, 2023, July, Cambodia Financial Technology Development Policy 2023-2028, p. 8.
<https://mef.gov.kh/download-counter?post=9533>

a. Demographic Trends as Demand Drivers

Like the bigger players, Cambodia’s emerging economy inhibits favorable demographic characteristics to fuel a flourishing Fintech sector. To begin with, Cambodia has a strong GDP, with pre-pandemic annual growth averaging approximately 7.7% (World Bank, 2022), expanding its middle class, and in turn their consumption and increasing need for affordable financial products and services. The growing population of around 17 million is predominantly young and dynamic as well, with over 60% being under the age of 30 (UN Cambodia, 2021). Considered to be digital natives, Cambodian youths are more inclined and ready to adopt quick and convenient digital services such as online shopping and payments, ride hailing, and food deliveries, essentially spearheading the country’s socio-cultural transition from traditional cash transactions to digital transactions.

In addition, Cambodia has a large underbanked and unbanked segment, of which 30 to 40% of its adult population is estimated to still not have access to formal financial services (World Bank, n.d.-b; David, 2024). The figure runs parallel with the fact that a large proportion of the Cambodian economy operates in the informal sector. Based on the latest data from the International Labour Organization (ILO), only 3.5% of enterprises in Cambodia are registered, whereas 88.3% of workers engage in informal employment (ILO, 2024). Due to several factors such as lack of documentation and financial record, high interest rates and transaction costs, collateral requirements, and limited awareness of financial services, informal unregistered enterprises, and workers tend to have difficulty accessing formal credit and other financial services (ADB, 2022), opting towards informal financial services, which are often unsecured and predatory. Hence, such demographic

descriptions overall indicate strong demands for different types of financial services and socially beneficial solutions that Fintech companies can develop and deliver in the Cambodian market.

Besides demand, Cambodia shows promising signs of digital readiness for scaling Fintech adoption with considerably high internet penetration and mobile device adoption rates. In figures, at the start of 2024, Cambodia's internet penetration was recorded at 56.7%, cellular mobile connections at 144.7%, and social media users equivalent to 68.4% of the population (Kemp, 2024).

b. Fintech's Role in Transforming Cambodia's Financial Landscape and Economy

Since the Covid-19 pandemic, Fintech adoption has profoundly accelerated in Cambodia, positioning it as among the top industries to invest in (IPS, 2023). The digital payments subsector especially, which includes E-wallets, QR code payments, and Peer-to-Peer (P2P) money transfer services, saw the most dramatic growth with total transactions volume exploding from \$95.31 billion in 2020 to over \$492 billion in 2023, equivalent to 12 times the country's GDP (Chea, 2022; Cambodia Investment Review, 2023a; Cambodia Investment Review, 2023b). Such rapid adoption of digital payment has aided the growth of Cambodia's e-commerce sector, of which market value has reached approximately \$1.12 billion in 2024 (Chea, 2025). By 2027, digital payment is expected to reach 8.76 million users (Im & Kosal, 2024), conveniently connecting financial institutions with small businesses, merchants, and general consumers, significantly expanding financial inclusion efforts in Cambodia. Besides digital payments, key services now available via mobile banking applications and web-based platforms also extend to other Fintech subsectors such as digital remittance, digital loans, digital insurance, and digital investment in securities. These services cater to the various financial needs of population groups and sectors; for instance, providing low-cost access to formal remittance channels for migrant workers, access to financing for micro, small, and medium enterprises (MSMEs), agricultural insurance coverage for farmers, and investment opportunities in digital assets.

Recognizing Fintech's role in transforming Cambodia's financial landscape and economic connectivity, the government has been proactive in supporting the growth and evolution of the sector. Notably, since the launch of the Financial Sector Development Strategy 2016-2025 by the National Bank of Cambodia (NBC) in 2016 to modernize the financial sector, the government has followed up with various policy initiatives embracing Fintech. In 2018, a Fintech Steering Committee was established to oversee the promotion and regulation of digital financial services. Following, 2020 saw the introduction of the Payment System Operator (PSO) license to regulate providers of payment services, and the launch of a central bank digital currency (CBDC) via Bakong, a mobile payment system using blockchain technology. The Bakong project in particular demonstrates Cambodia's pioneering lead in CBDC adoption and Fintech innovation, allowing users to make seamless transactions between financial institutions and payment service providers in the country, as well as cross-border transactions with partnered banks in the region

(Takemiya, 2021). It serves as both a solution for Cambodia's predicament, to facilitate de-dollarization, financial inclusion, connectivity, international trade, and tourism promotion, as well as a potential model for other countries to explore for their context.

Likewise, 2023 marks another significant development in Cambodia's regulatory framework for the sector with the launch of the Financial Technology Development Policy 2023-2028. The policy outlines 52 measures in total to guide Cambodia's Fintech sector development for the next five years, aiming at increasing financial inclusion, improving efficiency, promoting competition, attracting more investments, and strengthening the regulatory environment to support innovation while maintaining financial sector stability (Digital Economy and Business Committee, 2023). The aforementioned initiatives are just a key few among the many others that have been put out to date.

c. Pressing Challenges and Policy Areas to Consider as Cambodia Embraces Fintech

While great progress has been made in Cambodia's Fintech sector over the last decade, many hurdles still remain hindering the full realization of its potential. Like any emerging economy with capacity constraints, Cambodia's ambition to embrace a robust Fintech sector is met with the daunting question of how to manage Fintech risks to a minimum level. The associated risks can range from financial aspects, to operational, cybersecurity, and consumer protection (Kwon et al., 2023).

Considering that the size and scale of Fintech operation is still small in Cambodia, financial risks related to credit and liquidity default remain of moderate concern, however, with the sector expected to undergo rapid growth, regulatory and compliance gaps will need to be duly addressed to ensure a stable financial sector. In terms of operational risks, stakeholders in Cambodia's Fintech ecosystem have raised concerns regarding insufficient digital infrastructure and operational capacity such as the lack and quality of internet access in rural remote areas, limited tech talents and support for startups in terms of funding and technical knowledge, weak business models, and unfair market competition (White, 2022; Vong et al., 2020).

Similarly, cybersecurity and consumer protection remain top concerns to be addressed in Cambodia's context. The introduction of new Fintech technologies, paired with low digital and financial literacy rates among the population, as well as missing legal protective measures such as a comprehensive cybersecurity law, and personal data protection law - which are still currently being developed, can expose significant cybercrime risks for consumers. As a matter of fact, Cambodia saw an alarming rate of 7,345 data theft cases reported in 2021, of which the banking sector was the most targeted, receiving 21.3% of all phishing attacks (Nhean, 2023). Early this year, the Ministry of Post and Telecommunication has cautioned that cyberattacks in the country have been increasing at nearly 25% annually (Ranvindran, 2025). The increase in risk is attributed to the rise of the Fintech sector and the digitalization process sweeping across every other sector in Cambodia.

Conclusion

In conclusion, it is crucial for GMS countries, especially the emerging economies, to place strategic focus on financial services development to facilitate their integration process into the global economy for the next decade. With the digital future insight, the Fintech sector holds various merits for those willing to embrace it. Acting as an intermediary, Fintech supports and stimulates the whole economy. It strengthens and improves the efficiency of the financial system, and drives up financial inclusion by allowing all segments of the population to access financial services at a reduced transaction cost. Such increase in financial access and inclusivity is bound to generate greater economic activities and new growth drivers. As evident in Cambodia's adoption of Fintech over the last decade, the country's economy is rapidly undergoing a digital transformation. For instance, the rise of digital payments has led to the thrive of Cambodia's e-commerce sector. Hence, Fintech adoption presents a timely opportunity for Cambodia to pursue a smart sectoral diversification strategy that allows it to leapfrog into more complex economic activities, essentially moving up the global value chains.

Correspondingly, there are risks as well as merits. With Cambodia's limited capacity as an emerging economy, it is susceptible to high risks, especially in cybersecurity and consumer protection. As the sector continues to evolve, stakeholders will be challenged on how to address and mitigate Fintech risks to a minimum level. Current limitations in terms of infrastructure, regulation, and capacity-building are policy areas that need to be addressed moving forward.

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Sustainability in Practice: Case Studies from Chiang Mai, Thailand and Policy Recommendations for the GMS

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Abstract

Environmental sustainability is a pressing concern across the Greater Mekong Subregion (GMS), where rapid urbanization and economic development have strained natural resources. This article examines three local sustainability initiatives in Chiang Mai, Thailand – BOPE, Melt District, and Scholars of Sustenance (SOS) Thailand – through the lens of the Triple Bottom Line and Circular Economy frameworks. Insights were gathered from hands-on student projects conducted as part of the Sustainable Business Management course at Chiang Mai University and supplemented by secondary research on these organizations. The findings reveal that these initiatives certainly successfully integrate sustainability into business practices and generate positive environmental and social impacts. However, challenges related to scalability, policy support, and public awareness persist. Comparative analysis with regional efforts in the GMS highlights opportunities for policy alignment and cross-border collaboration. This article provides actionable policy recommendations to foster sustainable development in Chiang Mai and the broader GMS.

Keywords: Environmental Sustainability, Circular Economy, Triple Bottom Line, Chiang Mai, Greater Mekong Subregion.

I. Introduction

A. Environmental Sustainability Issues in the Greater Mekong Subregion

Environmental sustainability has become a critical global issue, particularly in regions experiencing rapid urbanization and economic development. The Greater Mekong Subregion (GMS) which includes Cambodia, the People's Republic of China (specifically Yunnan Province and Guangxi Zhuang Autonomous Region), Lao People's Democratic Republic, Myanmar, Thailand, and Vietnam - faces unique sustainability challenges due to its heavy reliance on natural ecosystems. (Greater Mekong Subregion, 2025). These ecosystems provide essential resources for approximately 2.6 million square kilometers

and are home to a population of around 326 million people. They contribute between 20% and 55% of the region's wealth, providing essential resources for approximately 200 million people (Asian Development Bank, 2025). However, urban development, resource depletion, and environmental degradation threaten the region's long-term ecological and economic stability.

B. Chiang Mai and Its Sustainability Challenges

Chiang Mai, a major urban center in northern Thailand, is facing these sustainability challenges. The city's rapid economic growth, particularly in tourism, has significantly impacted its environment. In 2023, Chiang Mai's tourism sector demonstrated a robust recovery, generating an estimated 100 billion baht (Approximately 2, 971 million US dollars) in revenue (The Nation, 2024). This growth shows that the province's economy is recovering after the COVID-19 pandemic. Such rapid development has resulted in increased air pollution, waste management issues, and greenhouse gas emissions.

C. Purpose of the Article

This article seeks to contribute to the scholarly and policy-oriented discourse on environmental sustainability within the Greater Mekong Subregion (GMS) by focusing on the case of Chiang Mai, Thailand. As an urban center experiencing rapid economic and demographic growth, Chiang Mai faces high environmental pressures that require locally grounded yet regionally informed responses.

This article has three main objectives:

To explain the importance of environmental sustainability in Chiang Mai by emphasizing the city's ecological vulnerability and the critical need for sustainable resource management in the face of urbanization, air pollution, and waste generation. Understanding the environmental stakes at the local level is essential for guiding effective planning and intervention.

To showcase sustainability initiatives led by selected organizations in Chiang Mai as practical illustrations of how environmental sustainability can be advanced through community-driven, innovative, and entrepreneurial approaches. By examining the practices of BOPE, Melt District, and Scholars of Sustenance (SOS) Thailand, the article demonstrates how local actors contribute meaningfully to addressing environmental challenges.

To summarize the lessons learned from these initiatives and provide actionable policy recommendations for stakeholders in both Chiang Mai and the broader GMS. These recommendations aim to strengthen local sustainability practices, foster regional collaboration, and support the integration of environmental objectives into broader development strategies.

II. Theoretical Framework: The Triple Bottom Line and Circular Economy

To assess the sustainability initiatives in Chiang Mai, the analysis in this article employs two widely recognized frameworks: The Triple Bottom Line and the Circular Economy.

A. Triple Bottom Line:

John Elkington introduced the concept of the Triple Bottom Line in 1997 as a framework for measuring corporate success beyond financial performance. The Triple Bottom Line emphasizes three interrelated dimensions: People, Planet, and Profit. This approach encourages businesses to consider their social, environmental, and economic impacts collectively rather than focusing merely on profitability.

- **People (Social Responsibility):** This dimension assesses a company's impact on employees, communities, and stakeholders, advocating for ethical labor practices, fair wages, and corporate social responsibility.
- **Planet (Environmental Sustainability):** Companies are encouraged to minimize their ecological footprint by reducing waste, conserving resources, and adopting sustainable production methods.
- **Profit (Economic Viability):** While financial success remains essential, the Triple Bottom Line suggests that profits should be generated ethically and sustainably without harming society or the environment.

Until now, the Triple Bottom Line framework has influenced corporate sustainability reporting and responsible business practices worldwide, encouraging a more holistic view of success that integrates sustainability with financial growth. Organizations committed to sustainability shall balance these dimensions to achieve long-term viability (Elkington, 1997). This framework is particularly useful in evaluating how the selected initiatives in Chiang Mai address not only environmental concerns but also social and economic impact concerns.

B. Circular Economy (CE):

The circular economy is an economic system aimed at eliminating waste and the continual use of resources. It contrasts with the traditional linear economy, which follows a "take, make, dispose" model. In a circular economy, the focus is on designing products and systems that allow for the reuse, refurbishment, remanufacturing, and recycling of materials. It creates a closed-loop system that minimizes resource input and waste generation. This approach not only conserves resources but also offers economic and environmental benefits by fostering innovation and reducing environmental impacts (Stahel, W.R., 2019). This framework is especially relevant in the context of Chiang Mai's waste management challenges.

It could be viewed that the Triple Bottom Line and Circular Economy frameworks provide a comprehensive lens through which to evaluate the sustainability performance of BOPE, Melt District, and SOS Thailand.

III. Environmental Challenges in Chiang Mai

In 2024, Chiang Mai population is around 1.8 million people and a latent population of 2 million people, for a total of approximately 3.8 million people. Due to the high number of residents, the city faces several pressing environmental challenges that underscore the importance of sustainable business practices (Environmental and Regional Planning, Research and Consulting, 2024). The environmental challenges in Chiang Mai can be classified as below:

A. Air Pollution:

Chiang Mai province experiences severe air pollution, particularly during the dry season (December to April), when agricultural burning worsens particulate matter levels. On multiple occasions in 2024, Chiang Mai topped a list of the world's most polluted major cities kept by the Swiss technology company IQAir. IQAir data shows that levels of PM2.5 (fine particulate matter) in March and April, averaged from 2017-2023, were nearly 100 micrograms per cubic meter, roughly 20 times the level considered safe by the World Health Organization (WHO). An array of research indicates that smoke from biomass burning is the largest contributor to poor air quality in Chiang Mai during the dry season. This has led to increased incidences of respiratory and cardiovascular diseases among the local population (World Health Organization, 2023). Some estimates suggest that poor air quality causes tens of thousands of hospitalizations each year and costs the city as much as 50 billion baht (\$1.5 billion) in tourism revenue decline. Data from satellites and ground-based stations indicate skies have gotten hazier since 2005 (Nasa Earth Observatory, 2025).

B. Greenhouse Gas Emissions:

From 2015 to 2019, Chiang Mai's average energy-related CO₂ emissions were approximately 2,146,060 tons of carbon dioxide equivalent (tCO₂eq) annually, with residential, industrial, and commercial sectors as primary contributors (Sugsaisakon & Kittipongvises, 2021). (Note: A carbon dioxide equivalent or CO₂ equivalent, abbreviated as tCO₂eq is a metric measure used to compare the emissions from various greenhouse gases because of their global-warming potential, by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential (Eurostat, 2025). Despite the city's efforts to promote renewable energy, fossil fuel dependency remains high.

C. Waste Management:

On the assumption of waste generation rate per person is 1.1 kilogram per person per day, Chiang Mai generates approximately 2,000 tons of waste per day (excluding the latent

population). The waste is classified as organic waste (30%), recyclable waste (17%), general waste (50%), and hazardous or infectious waste (3%) (Environmental and Regional Planning, Research and Consulting, 2024). The city's insufficient comprehensive recycling infrastructure and public awareness contributes to environmental degradation.

IV. Case Studies: Local Sustainability Initiatives in Chiang Mai

There are several environmental sustainability initiatives in Chiang Mai. This article chose to examine three sustainability initiatives in Chiang Mai namely BOPE, Melt District, and Scholars of Sustenance (SOS) Thailand as these organizations aim to address these challenges. Insights were gathered from hands-on student projects conducted in my Sustainable Business Management course at Chiang Mai University, Thailand. Throughout the course, the students worked directly with these organizations and reported their sustainability practices and project outcomes. To gain more insight, I, as the course instructor, conducted secondary research to better understand each organization's approach to sustainability. By applying the Triple Bottom Line and Circular Economy frameworks and situating these initiatives within the broader context of the GMS, this review offers actionable policy recommendations for stakeholders across the region.

A. BOPE: Upcycling Plastic Waste through Design Innovation:

BOPE is a Chiang Mai-based brand that transforms discarded plastic into functional and aesthetic products, such as coasters, vases, and home décor accessories. The initiative focuses on upcycling high-density polyethylene (HDPE) and polypropylene (PP) plastics, contributing directly to the Circular Economy by extending the lifecycle of plastic materials (Baramée, 2023).

Through student projects, it became evident that BOPE's impact extends beyond waste reduction. The organization actively engages with the local community by offering workshops on waste segregation and sustainable consumption, aligning with the people pillar of the Triple Bottom Line framework. However, BOPE faces challenges in ascending its operations due to limited access to advanced recycling technologies and policy support for small-scale sustainability enterprises. Secondary research further highlighted the brand's commitment to aesthetic innovation, which helps attract environmentally conscious consumers while promoting circular economy practices (Baramée, 2023).

B. Melt District: Circular Economy in Design and Architecture:

Melt District is a company that exemplifies the application of circular design principles within the fields of architecture and product development. The company manufactures "melt sheets," a sustainable material produced entirely from 100% recycled plastic, which are utilized in a range of design and construction applications. These durable sheets are useful and can be fabricated into a variety of products, ranging from larger items such as tables and cupboards to smaller items like coasters.

Students working with Melt District explored the lifecycle of plastic products and examined how design thinking can address environmental challenges. The organization's commitment to the planet pillar of the Triple Bottom Line framework and its contribution to economic sustainability through innovative business models are noteworthy. However, secondary research revealed that circular design practices is not widely used in Chiang Mai due to limited government support and low public awareness, which reduces the market for sustainable materials (Meltdistrict, 2021).

C. Scholars of Sustenance (SOS) Thailand: Tackling Food Waste and Insecurity:

Founded in 2016, Scholars of Sustenance (SOS) Thailand operates as the first food rescue foundation in Thailand. The organization is redistributing surplus food from hotels, supermarkets, and restaurants to communities in need. In Chiang Mai, SOS rescues approximately 1,000 kg of food per day, significantly reducing food waste and greenhouse gas emissions associated with landfill disposal (Scholars of Sustenance, 2024).

Students' engagement with SOS provided firsthand insights into food rescue logistics and community outreach. The initiative illustrates the people and planet pillars of the Triple Bottom Line by addressing both food insecurity and environmental degradation. Secondary research showed that although SOS has made a strong environmental and social impact, rules about food donation liability make it difficult for the organization to grow (Scholars of Sustenance, 2024).

V. Comparative Analysis: Lessons from Regional Sustainability Initiatives:

While Chiang Mai's local initiatives demonstrate significant potential in advancing environmental sustainability, their broader relevance is better understood within the context of regional efforts across the Greater Mekong Subregion (GMS). Several countries within the GMS have adopted national strategies that embed sustainability into their development agendas, offering valuable lessons in both government-led policy design and multi-sectoral implementation.

A. Vietnam's National Green Growth Strategy:

One of the most significant initiatives among the GMS countries was Vietnam's National Green Growth Strategy (VGGS). It was launched in 2012 and updated in 2021, characterizes a top-down approach to environmental management. It emphasizes low-carbon development, resource efficiency, and technological innovation as core objectives. The strategy is supported by fiscal incentives, international cooperation, and the integration of green growth principles into sub-national plans. Notably, Vietnam's commitment to circular economy principles is evident in its plastic waste reduction roadmap and its pilot programs in sustainable urban planning (Asia Leds Partnership, 2013).

Compared to the grassroots initiatives observed in Chiang Mai, such as BOPE and Melt District, Vietnam's national policies provide a more enabling environment for circular

business models. However, Chiang Mai cases offer a complementary bottom-up perspective that demonstrates how community-driven action and creative enterprise can initiate sustainability transitions in the absence of strong state incentives.

B. Cambodia's National Environment Strategy and Action Plan:

Another profound initiative was Cambodia's National Environment Strategy and Action Plan (NESAP) 2016–2023. It reflects growing institutional recognition of environmental issues, focusing on biodiversity conservation, climate resilience, and sustainable natural resource management. While Cambodia has made strides in integrating environmental impact assessments into development projects and expanding protected areas, implementation challenges persist due to limited institutional capacity and funding (Royal Government of Cambodia, 2017).

Compared to Chiang Mai's SOS Thailand, which operates efficiently at the intersection of environmental and social issues, Cambodia's public sector efforts would benefit from deeper collaboration with civil society organizations to achieve integrated sustainability outcomes. SOS's food redistribution and community service model shows how flexible, focused actions can quickly bring environmental and social benefits. This would be an approach that could help guide similar efforts in Cambodia and other countries.

C. Thailand's Bio-Circular-Green Economy Model:

Thailand's Bio-Circular-Green (BCG) Economy model, endorsed as a key strategy under Thailand's 20-Year National Strategy (2018–2037), promotes innovation-driven development rooted in biodiversity, circular processes, and green innovation. While this vision aligns with the principles embodied by BOPE and Melt District, there is still a gap between government policy and action at the local level. Local entrepreneurs in Chiang Mai continue to face challenges such as insufficient financial support, unclear regulatory guidance, and a lack of coordination between local and national agencies. This highlights the need for more coherent multi-level governance that bridges the gap between policy frameworks and the realities faced by sustainable enterprises.

D. Chiang Mai's Sustainability Initiatives:

What distinguishes Chiang Mai initiatives is their practical and participatory approach, which may not well-align with the more centralized strategies seen in neighboring countries. BOPE demonstrates how creative upcycling can raise public awareness and drive behavioral change from the ground up. Melt District exemplifies how design innovation rooted in circular economy thinking can be commercialized without sacrificing environmental values. SOS Thailand, meanwhile, offers a replicable model for addressing food insecurity and waste simultaneously – issues that are seen treated separately in formal government planning. These cases collectively illustrate that community engagement, adaptability, and cross-sector collaboration are essential to effective sustainability implementation, particularly in urban settings where policy may not be able to respond to rapidly evolving environmental challenges.

Moreover, Chiang Mai experience emphasizes the role of education and youth engagement in fostering long-term sustainability. The student-involved projects discussed in this article underscore how higher education can act as a catalyst for environmental stewardship. By embedding sustainability into experiential learning, institutions like Chiang Mai University, Thailand contribute to a cultural shift toward sustainability, a dimension that regional governments could integrate more systematically into national strategies.

In summary, while apparently more top-down strategies in the GMS offer valuable institutional support, Chiang Mai's localized, bottom-up initiatives reveal equally important insights. Sustainable development in the GMS would be most effective when it harmonizes macro-level policy with micro-level practice, enabling local innovation to flourish within a supportive national and regional framework. The three Chiang Mai case studies offer not only models of successful implementation but also highlight gaps in current policy structures that could be addressed through integrated, multi-scalar governance.

VI. Policy Implications and Recommendations:

To scale and institutionalize environmental sustainability in Chiang Mai and across the Greater Mekong Subregion (GMS), a multi-faceted and inclusive policy approach is necessary. Drawing from the findings of this study, the following recommendations are proposed:

Incentivize Circular Economy Practices

Governments and regional authorities should establish fiscal and regulatory incentives to promote the adoption of circular economy models across industries. This may include tax reductions, green business certifications, and preferential procurement policies for companies that demonstrate measurable sustainability outcomes. By lowering entry barriers for eco-innovators and upcycling business enterprises such as BOPE and Melt District; policymakers can accelerate the mainstreaming of circular production and consumption systems, thus reducing resource intensity and environmental impacts.

Strengthen Public-Private-Academic Partnerships

Collaborative frameworks among government agencies, private sectors, and academic institutions should be developed to facilitate knowledge transfer, pilot sustainability innovations, and support community-based environmental programs. Universities and research institutions can play a critical role in fostering innovation, monitoring, and assessing impact. The integration of student and community projects, as highlighted in this study proves how higher education can bridge theory and practice to address sustainability challenges at the local level.

Establish Food Donation Liability Protections

To encourage private sector engagement in food rescue operations, legal frameworks

should be introduced that protect donors from liability when contributing safe, surplus food to registered organizations. This approach, already in place in several developed countries, can incentivize greater participation in food redistribution networks and expand the reach of organizations alike Scholars of Sustenance. In parallel, awareness campaigns and logistical support from local governments can enhance the efficiency and trustworthiness of food rescue systems.

Develop Integrated Waste Management Policies

Local governments in Chiang Mai and the like urban centers shall adopt inclusive waste management strategies that prioritize waste separation at source, incentivize recycling behavior, and support innovations in upcycling and composting. Policy tools such as extended producer responsibility, and green design regulations could be reassigned accountability to producers while encouraging consumers to engage in sustainable waste practices. These policies are strongly suggested to be supported by infrastructure investments and public education campaigns to be effective.

Integrate Sustainability Education and Youth Engagement

Educational institutions at all levels should embed sustainability as a cross-cutting theme within their curricula, moving beyond theoretical instruction to experiential learning approaches. As evidenced in the Sustainable Business Management course discussed in this study, when students are engaged in real-world sustainability projects with local enterprises, they not only acquire conceptual understanding but also develop a deep sense of urgency, responsibility, and ownership. Students learn to identify sustainability problems, explore mitigation strategies, understand underlying rationales, and appreciate best practices. Critically, they recognize the importance of immediate action. Therefore, education systems must prioritize youth engagement through fieldwork, service learning, and community-based sustainability initiatives. Empowering young people to be change agents is important to advancing long-term environmental and societal resilience.

VII. Conclusion

Chiang Mai's local initiatives including BOPE, Melt District, and Scholars of Sustenance have demonstrated the potential of community-driven, innovative solutions to advance environmental sustainability. By applying the Triple Bottom Line and Circular Economy frameworks, this paper highlights how these organizations balance social, environmental, and economic goals. However, broader policy support and regional collaboration are essential to scale up these initiatives and address systemic sustainability challenges in the Greater Mekong Subregion.

Through student projects and secondary research, it is obvious that sustainability is not only an environmental imperative but also a pathway to economic resilience and social equity. By integrating policy recommendations and fostering cross-sector partnerships, Chiang Mai can modestly serve as a model for sustainable urban development in the GMS.

Acknowledgements

I would like to express my sincere gratitude to BOPE, Melt District, and Scholars of Sustenance Thailand for graciously allowing my students from the Sustainable Business Management course at Chiang Mai University to engage in hands-on projects with their organizations. These invaluable experiences provided the students with the opportunity to apply theoretical knowledge to real-world sustainability challenges, deepening their understanding of how sustainable practices can be effectively integrated into business operations.

I also deeply appreciate the significant contributions these organizations have made toward advancing environmental sustainability in Chiang Mai. Their innovative approaches not only demonstrate how businesses can adopt sustainable practices but also generate tangible, positive impacts on the community and the environment. The work of BOPE, Melt District, and Scholars of Sustenance serves as an inspiring example of how local initiatives can drive meaningful change, fostering both environmental preservation and social well-being.

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The Dynamic Model of Green Product Innovation: Material Recovery Product Marketing towards Resource Efficiency

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Abstract

This conceptual paper introduces the dynamic model of green product innovation regarding firms that innovate in material recovery technology and provides recycled / refurbished / remanufactured products to the market in response to the dynamic change in popularity of green consumerism. As dynamic capabilities have been defined as tools for containing against dynamic change in the business environment, the focal model strategically aims to portray the relationship between green product innovation, dynamic capabilities, marketing capabilities, competitive advantage, and performance. Thus, the model proposes that green product innovation influences the firms' competitive advantage both directly and indirectly via the mediating roles of dynamic capabilities and marketing capability. Likewise, in green marketing, dynamic capabilities indirectly influence competitive advantage through the mediating role of marketing capability. Meanwhile, marketing capability plays a crucial role in stimulating the competitive advantage. Finally, the competitive advantage finally results in sustainable firm performance, notably performance toward short-term and long-term marketing goals.

1. Introduction

Going green has become popular among consumers in both developed and developing countries. Accordingly, consumers are more conscious of the environmental impacts generated from their consumptions. Meanwhile, business sectors need to put efforts into the encouragement of green businesses, responding to 'green consumerism' towards sustainability. Encouraging consumers' green purchase is an influencing contribution to reducing negative environmental impacts. Accordingly, many firms have invested in green product innovation in order to meet the customers' demand (Al Mamun et al., 2018).

The aforementioned case of change in consumer consumption behavior towards sustainability is one of the dynamic changes in the market environment. In reality, coping with disruptive environmental change is a critical factor of a firm. More specifically, dynamic capabilities hold the potential to support the firm's adaptation to environmental

change. The Dynamic Capabilities (DCs) approach is rooted in the firm's resource-based view (RBV). An organization with valuable and scarce resources tends to have advantages over others, and RBV is a tool to integrate and maximize the utility of resources. Thus, RBV plays a crucial role in attaining sustainable competitive advantage (Tariq et al., 2022). Generally, it is hard to retain a sustainable competitive advantage in disruptive environments, so that the firms have to reconfigure the resources in response to the dynamic change. DC focuses on the ability to adapt to more aggressive external environments through combinations of existing or new resources.

According to previous studies, the dynamic capability is an antecedent of rents that provide a competitive advantage in a dynamic market since it is essential for adjusting to and even capitalizing on fast-changing conditions (Bocken & Geradts, 2020). However, the question of how to increase the impact of green product innovation on competitive advantage through green dynamic capabilities is critical for management practice. This paper aims to introduce the role of dynamic capabilities as the factors of competitive advantage of the firms that innovate in green products with material recovery technic. Section 2 portrays the literature review, and Section 3 introduces the Dynamic Model of Green Product Innovation regarding material recovery products. Meanwhile, and Section 4 presents the discussion and concludes the study.

2. Literature Review

2.1 Green Product Innovation and Material Recovery

Companies can reduce negative environmental impacts while maintaining economic benefits by executing rigorous innovation initiatives. By offering green products, a corporation can improve resource productivity, earnings as well as corporate image. Environmental sustainability is linked to green product innovation, and green product innovation should be viewed as a win-win situation instead of an additional cost. Green product innovation focuses on goods that use fewer resources or less energy over their whole life cycle. Leading organizations with green product innovation can sell environmental technologies or services, enhancing their brand image and potentially opening up new markets.

Firms can contribute to green product innovation via material recovery. Sensitivity to environmental issues has urged the consumer to support the diffusion of green marketing and ecologically-conscious consumer behavior, thus increasing the demand and supply of products made from used contents. Relevant processes of material recovery at the organizations include:

- Refurbishing: Large improvements on a product, for example, by restoring the components, which may bring it to a like-new state, but with limited functionality and shorter lifetime;

- Remanufacturing: Manufacturing activities on an 'end-of-life part or product to guarantee a like-new quality with like-new functionalities;
- Recycling: Reprocessing of a product's materials into raw materials with either the same or lower qualities for use in new products.

2.2 Green Marketing of Material Recovery Product

Although it is unarguable that 'sustainability encouragement' leads to a positive impact of material recovery on the environment as well as company's image, the relationship between consumers' environmental awareness and their decision to purchase recycled, refurbished or remanufactured products is still unclear (Bittar, 2018). Therefore, it is essential to employ 'green marketing' to explore the hidden consumer perceptions and intention. To market green products successfully, a company needs to set up an appropriate green consumer segment, offer green benefits that align with this segment's values and attitudes, and most importantly, communicate such benefits to the customers effectively.

2.2.1 Green Purchase Behavior and Green Purchase Intention

For an individual, green purchase behavior is considered one of the pro-environmental behaviors. It is any action of consuming products that bring substantial benefits to the environment, and at the same time demonstrate positive attitudes toward the environment (Yadav & Pathak, 2017). In this paper, green purchase behavior refers to "buying the product wholly or partially made from reused, recycled, refurbished or remanufactured materials".

Intention refers to "willingness or readiness to engage in behavior under consideration". Intention plays a significant role to mediate the relationship between attitude and behavior (Jaiswal & Kant, 2018; Kumar et al., 2017; Xu et al., 2017). Particularly, green product purchase intention is an indicator for measuring to what extent consumers are willing or ready to adopt green alternatives.

2.2.2 Attitudes Toward Green Product

Generally, attitude is operationalized by evaluating how an individual feels the performance of an action (Xu et al., 2017). Attitudes toward the behavior refer to the "degree to which a person has a favorable or unfavorable evaluation of the behavior in question". Attitudes toward green products are the degree to which the performance of buying a green product is negatively or positively valued by an individual. When a consumer has a positive mindset of green purchasing, he or she will have a higher intention to use (to purchase) green products. Attitudes toward green products play the major role in stimulating the intention to purchase environmentally friendly products (Al Mamun et al., 2018; Yadav & Pathak, 2017).

2.2.3 Perceived Consumer Effectiveness (PCE)

Apart from the purchase intention, the potential of perceived consumer effectiveness (PCE) as an antecedent of green purchase intention and behavior has also been tested in many researches (Jaiswal & Kant, 2018). In particular, PCE exists when it is appealing to a consumer that his or her purchase makes a difference. Conceptually, an individual's intention or actual action is based on the degree to which he or she believes that such action will create either positive or negative change to the given situation. Particularly, collectivists tend to think in terms of the good of the groups, hence intend to behave in an environmentally friendly manner. On the other hand, individualists may relate to PCE in negative ways and focus more on self-advantages than public benefits.

2.3 Perceived Green Corporate Image as a Long-term marketing goal

Most of the time, businesses have been focusing on the sales volume, aiming to reach short-term goal to increase the revenue and market share. However, marketers are also in charge of pushing the firms to reach the long-term marketing goal which is the positive reputation towards sustainable customer loyalties. Accordingly, there might be the conflicts between short-term sales targets and long-term maintenance of a positively high level of brand image (Datta et al., 2017). Despite the fact that marketing is expected to leverage market-based assets to encourage short-term outcome, some marketing actions may damage the long-term brand image. As marketing emphasizes a long-term orientation, marketers are required to be careful of any initiatives that might lead to short-sighted actions.

2.4. Dynamic Capabilities (DCs) and the micro foundations

Dynamic capabilities (DCs) are a company's abilities to integrate, build, and reconfigure internal and external competencies in order to manage quickly changing circumstances. DC is also defined as the procedures that reorganize a firm's resources and operational routines in the way that its primary decision-makers envision and believe appropriate (Teece, 2007). Accordingly, to develop suitable dynamic capabilities view, the decision-makers need to follow the micro foundations of dynamic capabilities.

The micro foundations of dynamic capabilities are sets of the company's required tasks to build the dynamic capabilities. "Sensing, seizing, and reconfiguring" are examples of such tasks. For a business, the strategy is defined as the behavior of warding off competitors, raising entry barriers, and excluding potential new rivals. According to the dynamic capabilities approach, identifying new opportunities (sensing), effectively organizing them (seizing), and adopting them (reconfiguring) is more critical than the strategy itself (Helfat & Peteraf, 2015).

In the first stage, businesses must concentrate on sensing the operations to discover new prospects. Managers must examine, learn, and evaluate all available data. Sensing tasks enhance the discovery of hidden opportunities and the creation of new ones. Firms will

have to carry out these actions deliberately and systematically rather than relying on luck. Managers must discover a means to comprehend all of the data available better. Finally, they will have to identify the pertinent facts on which to concentrate their efforts (Ocasio, 1997).

Once a possible chance is discovered, the following stage is to determine the opportunity and seize it. In seizing the opportunity, a business needs to figure out the business model, figure out what resources a firm will need, and decide whether or not to invest in certain technology or resources. It is necessary to achieve a high level of coordination of activities that affect various functional areas, which should be made concurrently rather than sequentially, especially if companies are trying to reduce the time for marketing new products or services (Teece, 2007).

After the evaluation of the opportunity, resource reconfiguration is required. Reconfiguring entails reallocating resources, ensuring that new combination boosts the company's value. Reorganization allows the corporation to respond to changes in the environment, eliminate outmoded practices, and promote long-term outcomes (Cepeda-Carrion et al., 2017).

Figure 1 illustrates the sequence of the micro foundations of dynamic capabilities.

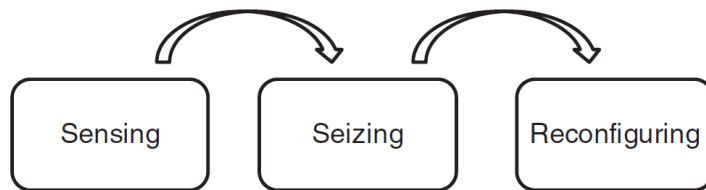


FIGURE 1: Sequence of the micro foundations of dynamic capabilities

2.5 Marketing Capabilities (MCs)

Marketing capabilities (MCs) are integrated activities that enhance the quality of products and services. Marketing capabilities are complex, coordinated patterns of skills, knowledge, and actions that enable businesses to transform available resources into market-related value outputs. They are challenging to design and assess because they entail both formal and informal processes. They are intertwined with other organizational and cross-functional operations. Consequently, when companies engage in high levels of marketing exploitation or exploration, they invest heavily in strengthening and upgrading their marketing capabilities. MCs are essential for new product development. Particularly, information about customer needs and rivals must be considered during the development process (Hamsioglu, 2016). Having great MC is crucial in effective product development and can lead to innovation. Knowledge of the competition and customers, expertise in segmenting and targeting markets, advertising and pricing, as well as combining

marketing efforts are examples of MCs. MCs that create valuable market information improve market responsiveness and contribute to long-term competitive advantages. Undoubtedly, the firm's MCs are inextricably linked to the company's brand image, which is reflected in the firm's performance.

2.6 Competitive Advantage and Firm Performance

The dynamic capability approach is an integrating and emerging approach that enhances the understanding of possible sources of the competitive advantage (Teece, 2007). Competitive advantage is based on a combination of unique internal organizational characteristics and constantly changing external circumstances. As an extension of the RBV theory, dynamic capabilities are organizational routines that affect change depending on business resources.

Organizational capabilities are the collection of assets that are built over time and applied to a specific value-added activity. Greater dynamic capabilities lead to a competitive advantage over their competitors. Specifically, companies should create green dynamic capabilities to exploit its green organizational capabilities to respond to a dynamic change. These abilities are crucial to the success of green product development. Organizations with green dynamic capabilities benefit from improved market and financial success (Gabler et al., 2015). Dynamic green innovation strategies improve the sustainability performance of businesses. In marketing aspect, competitive advantage depends on upstream of product markets and focuses on the firm's resources that are difficult to intimate. In this study, material recovery innovation represents inimitable resources of the firms with green product innovation.

3. Dynamic Model of Green Product Innovation

As environmental protection has swiftly become a mainstream issue due to the impact of terrible environmental contamination and global warming, more corporations are supplying green products to support environmental protection. Regarding environmental performance, innovative green products significantly outperform conventional or rival products. Therefore, companies that want to create successful ecologically creative projects must establish dynamic capabilities that consider environmental factors.

Accordingly, we propose the followings:

Proposition1: Green product innovation positively influences competitive advantage.

As mentioned earlier, dynamic capacity (DC) is a source of competitive advantage. DC is linked to changing environmental factors, implying that, as the rate of innovation continues to accelerate, predicting that future competition and market trends will be challenging (Qiu et al., 2020).

Green dynamic capability is a further developed subset of dynamic capability, representing a company's ability to accomplish long-term, environmentally friendly

growth in a continually changing environment. The integration, construction, and reconfiguration of internal and external resources connected to environmental protection is the focus of green dynamic capability. It may also gather, detect, and forecast external data such as changes in green technology, green demand, and other green development policies (Lin & Chen, 2017).

In this study, green dynamic capabilities consist of three factors: 1) resource integration capability, 2) resource reconfiguration capability, and 3) environmental insight capability.

Resource integration capability: The capacity to integrate internal and external resources is part of resource integration capabilities. The internal resources part is primarily concerned with the exchange and integration of internal environmental knowledge and capabilities, emphasizing the importance of collaboration between the environmental unit and other departments (Dangelico et al., 2017). External resources part stresses a company's ability to absorb knowledge from external sources, which includes the ability to interact, collaborate, and transfer knowledge among different external stakeholders. Moreover, the capacity to efficiently attract employees with environmental skills and knowledge is part of external resource integration.

Resource configuration capability: The reconfiguration of resources is the emphasis of resource reconfiguration capacity. Furthermore, dynamic capacities in highly dynamic markets are dependent on the rapid generation of new information and more variable processes (Li & Liu, 2014). As a result, green product innovation pushes businesses to alter existing cognitive models and promote knowledge on strategic changes. Green product innovation alters the process of reorganizing knowledge elements by preserving the original technical attributes of knowledge elements while expanding and reconstructing information. Green product innovation can be institutionalized and cemented at the organizational level by learning, developing, and transmitting new knowledge, enhancing the company's resource reconstruction capacities. The practice and accumulation of expertise in business model innovation is required for dynamic capabilities, to overcome organizational inertia and improve resource reconfiguration (Teece J. David, 2018).

Environmental insight capability: Understanding the economic environment allows organizations to examine how to address environmental concerns. Green product innovation, as a strategy for long-term success, necessitates not only internal resources but also execution procedures to build a whole package. In order to achieve the maximization of overall social welfare, the implementation process requires firms to continuously acquire experience, react to the external environment, and limit the impact of products on the natural environment. Green development is made of interconnected systems with dynamic and unpredictable properties, making environmental analysis and planning more complex (Fayoumi, 2016). As a result, in developing green products, companies must always consider environmental and social challenges. Green development supports the evolution of enterprise capacities and boosts companies' ability to respond to changes in their industries.

Accordingly, we propose the followings:

Proposition 2: Green product innovation positively influences green dynamic capability (resource integration capability, resource configuration capability, environmental insight capability).

Dynamic capabilities consist of three steps, including “sense”, which is the ability to monitor and identify opportunities, “seize”, which entails evaluating existing and emerging capabilities, and possible investment and “reconfiguration”, which refers to the creation, extension, and modification of resources as the company grows and the market changes (Teece, 2007). Marketing capabilities are built on exclusive knowledge that is difficult to duplicate by competitors. They have an external focus and reflect on the company's collective knowledge, talents, and resources related to the company's capabilities to meet certain customers. Marketing capabilities enable businesses to understand their customers' needs more clearly and DC supports the growth of marketing capabilities.

Accordingly, we propose the followings:

Proposition 3: Dynamic capabilities positively influence the marketing capability.

Marketing capability can be enhanced by using a green marketing approach to promote positive attitudes toward the green products, perceived consumer effectiveness (PCE), green product purchase intention, and the actual purchase of green products. This approach would drive more sales of the product with material recovery and simultaneously raise the positive green image of the company that employs material recovery innovation. The channels for green marketing regarding recycled / refurbished / remanufactured products include promoting environmental awareness such as TV commercials and social media. Furthermore, it may include the support of environmental education campaigns and transferring of knowledge on material recovery as well as its positive impacts on the society, economy, and natural environments.

Gaining sales revenue and establishing good reputation are the ultimate goals of marketing. Consumers' purchases lead to sales performance which is a short-term marketing goal. Meanwhile, marketers also pay attention to the company's green image because it is a reputational asset. Reputation generally refers to how external parties perceive the company, and particularly, green reputation is considered an intangible asset and can be the resource of competitive advantage (Teece, 2007). Both sales and reputation performances are driven by the competitive advantage that is the reflection of marketing capability.

Accordingly, we propose the followings:

Proposition 4: Marketing capability positively influences competitive advantage.

Proposition 5: Competitive advantage positively influences performance.

Figure 2 exhibits the Dynamic Model of Green Product Innovation.

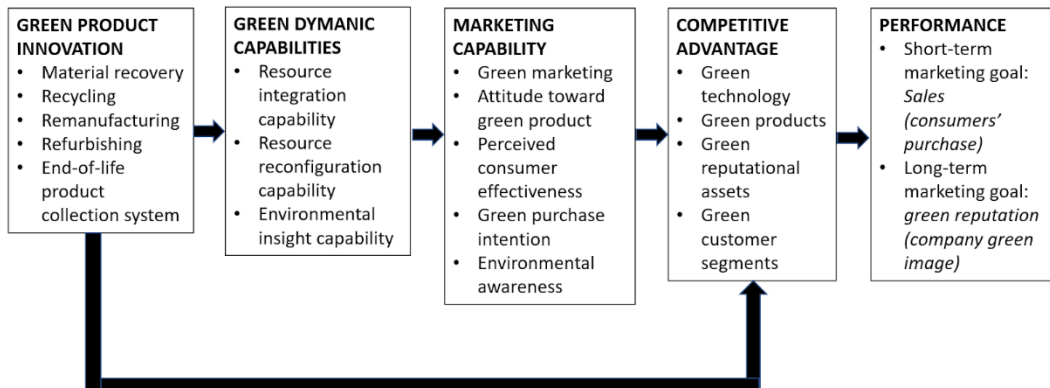


FIGURE 2: Dynamic model of green product innovation

5. Discussions and Conclusions

Dynamic capabilities focus on resource integration and reconfiguration in response to the dynamic change in business environments. Resource allocation are usually perceived in tangible aspects such as raw materials, equipment, and financial capital. This study also focuses on the marketing aspects, which is intangible and more abstract. Our proposed model is centered on the products with material recovery innovation that definitely bears high cost in the initial stage; however, it is hypothesized to bring positive results such as competitive advantage in the long run. Marketers should utilize green dynamic capabilities to enhance competitive advantage and marketing performances via the mediating role of marketing capability.

There is still a lack of understanding among consumers in terms of innovation on material recovery that positively impacts the environment. Many consumers state that they are green consumers, but not many of them have been engaged in choosing green alternative. Therefore, utilizing resources, especially the information and knowledge, to understand customer perception would drive better marketing capability. Accordingly, the dynamic capabilities, including resource integration capability, resources reconfiguration capability, and environmental insight capability, would support the firm in revealing more opportunities.

In this study, we employ both sales and reputation as the measures for performance. These measures represent the short-term (purchase) and long-term (green image) marketing

goals. It is essential to rely not only on the short-term sales revenue but also on the long-term sustainable customer relationship that generally resulted from the company's positive image. In this context, we pay attention to the reputation asset of green corporate image, targeting green consumers who possibly become the purchaser of material recovery products.

In conclusion, we propose that, through the mediating functions of dynamic capacities and marketing capabilities, green product innovation enhances businesses' competitive advantage both directly and indirectly. The dynamic capabilities influence the competitive advantage indirectly via the mediating role of marketing capability. Eventually, the competitive advantage would sustainably lead to long-term business performance, especially in regards to short- and long-term marketing objectives.

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Middle Powers Prefer to Hedge in the Second Cold War

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Introduction

In 1978, the exiled Russian novelist Aleksandr Solzhenitsyn (1918-2008) delivered the Commencement Address at Harvard University, in which he warned about the existential risks posed not only by the nuclear rivalry between the United States (US) and the Soviet Union, but also by the possibility that such a confrontation could drag the international community into another systemic war: “The split in today’s world is perceptible even to a hasty glance. Any of our contemporaries readily identifies two world powers, each of them already capable of utterly destroying the other” (Solzhenitsyn 1978).

Almost fifty years later, the world has been undergoing a new split between two great powers—namely, the US and China—that are increasingly squaring off for allies and military supremacy (Leoni and Tzinieris 2024). At the same time, while Russia remains a major power that envisions a future tripolar world order, for Washington and Beijing, it does not have the capacity to match their military and economic prowess, besides the fact that it has accelerated its long-term decline by invading Ukraine (Spektor 2023).

Facing this situation, middle powers, from Latin America to the Indo-Pacific, have sought to steer clear of getting caught in the crossfire between Washington, Beijing, and Moscow (Spektor 2023). “Middle powers” are countries that are not classified as either great or small in terms of international power, capacity, and influence. In fact, middle powers can belong to the Global North and the Global South, encompassing a cohort of countries as diverse as Brazil and Canada, or Vietnam and South Korea (Jordaan 2003).

Therefore, the current international context, characterized by the emergence and intersection of Chinese and US spheres of influence, provides a conducive environment for the ascendancy of middle powers amidst the intense great power competition (Chan and Lee 2024). This article aims to shed light on the strategy adopted by middle powers in their diplomatic endeavours, particularly focusing on their predilection for hedging. This approach provides a nuanced insight into how these nations might play the role of mediators between Washington and Beijing and what their new roles mean for both great powers.

The Onset of the Second Cold War: Fear and Loathing in Washington and Beijing

Years of swift economic advancement and enhancements in military capabilities have furnished China with the substantial resources required to embark on its journey as a hegemonic force (Lim and Ikenberry 2023). In fact, beginning with the implementation of its reform and opening-up policy under the leadership of Deng Xiaoping (1978-1992), China experienced an impressive average economic growth rate of 10 percent annually for over three decades. Post-2010, this growth rate moderated to 6 to 7 percent per year (Naughton 2020), and since the COVID-19 pandemic, it has shrunk to around 4.7 percent (World Bank 2021). In 2010, China ascended to become the world's second-largest economy, overtaking Japan, with its Gross Domestic Product (GDP/PPP) reaching US\$ 25.1 trillion (Allison 2017), while in 2023, it totaled US\$ 17.5 trillion (Chu 2024).

Beijing has also triggered an arms race with the US, steadily increasing its defense budget by about 10 percent per year between 2000 and 2016, and it reached US\$ 219.5 billion in 2023, the second largest in the world (The International Institute for Strategic Studies 2024). It has also focused on the expansion of its Navy, which became the world's largest in 2014, and, in 2023, it boasted 370 warships against approximately 280 US vessels (U.S. Department of Defense 2023). It is estimated that China has roughly 500 nuclear warheads and it is expected to have 1,000 by 2030. However, it still has only a tenth of the size of the US stockpile (Kristensen et al. 2024). At the same time, the US continues to hold the position of the most formidable military force worldwide, possessing unparalleled capacity for global power projection.

The economic and military ascent of China has prompted Beijing to more frequently express critiques of the existing global order and demonstrate a desire to reform it in alignment with its worldview and strategic objectives. Over the course of seven decades, the US has led a hegemonic system endowed with liberal attributes - the so-called Liberal International Order (LIO) -, which is structured around security alliances, free trade, multilateral norms, and institutions, as well as strategic alliances, which bind together the advanced industrialized democracies. The envisioned Sinocentric order focuses on the freedom of states to pursue varied national strategies without formal constraints, promotes mutually beneficial cooperation, and favors informal alliances for conflict resolution. We may hypothesize that, although these principles are not inherently illiberal, their potential appeal to autocratic states and reliance on pragmatic inter-state negotiations, as opposed to formal institutions, could lead to illiberal outcomes (Lim and Ikenberry 2023).

In 2023, the Biden administration released a series of national security policy documents, covering areas such as cyber security and science and technology, which were in alignment with the National Security Strategy (NSS) outlined in 2022. These documents emphasized China as the foremost strategic challenge confronting the US, while identifying Russia as a significant, albeit primarily regional, threat. This focus was further

reinforced within the same year through the introduction of a new National Defense Strategy (NDS), which was supported by the recently unveiled Nuclear Posture Review (NPR) and Missile Defense Review (MDR). The Pentagon has been persistently advancing its modernization initiatives, including updates to its nuclear capabilities and the deployment of hypersonic cruise missiles, among other systems (The International Institute for Strategic Studies 2024).

Aiming to achieve its hegemonic objectives, China has been competing with the US for allies and partners throughout the world. One significant advantage the US holds over China is its extensive global network of security alliances and partnerships. This network includes about 25 percent of the world's population and represents 75 percent of global GDP and defense expenditures. Furthermore, during the presidencies of Donald Trump (2016-2020) and Joe Biden (2021-2025), the US established minilateral organizations with key Indo-Pacific countries. This includes the formation of the QUAD in 2017, in partnership with Japan, India, and Australia, and the AUKUS in 2021, alongside Australia and the United Kingdom, which are two initiatives focused on countering China's regional influence (Chan and Lee 2024). In contrast, the Chinese military lacks experience in conducting joint military operations and essentially lacks any substantial alliances or partnerships to draw upon for military support in a potential conflict with the US (Hass 2021).

Walking on the "Middle Way": Middle Powers Embrace Hedging

In the context of the emerging Second Cold War, a period permeated by economic globalization and deep interdependence between different world regions, middle powers have actively embraced hedging. This strategy involves abstaining from taking sides in the great power rivalry and maintaining open channels of communication with every player (Chan and Lee 2024). By prioritizing autonomy, these hedgers may form temporary partnerships to achieve specific foreign policy goals, but they generally shy away from establishing broad alliances. This approach sets modern hedgers apart from the nonaligned countries during the Cold War. In that era, amidst bipolar global tensions, nonaligned developing nations united under a common identity to advocate for greater economic fairness, racial equality, and the end of colonialism, establishing lasting alliances within multilateral institutions. In contrast, contemporary hedgers primarily aim to navigate the complexities of choosing sides between the leading great powers, opting for multi-alignment (Spektor 2023).

Above all, middle powers aim to avoid commitments that could become burdensome, seeking to gain the maximum advantage from both rival great powers. Yet, they must tread cautiously to avoid escalating tensions between such powers. Moreover, possessing limited means to impact global affairs, middle powers seek to maintain the flexibility to swiftly adjust their foreign policies in response to unforeseeable events (Spektor 2023). Middle powers possess the capacity to elevate their demands to great powers in return for cooperation or influence and have the capability to reject directives from them if they

perceive a threat or find themselves overly reliant (Thao 2023). Another key characteristic of these countries is that they often fear that economic interdependence might undermine their sovereignty. Consequently, they generally focus on bolstering domestic markets and national self-sufficiency (Spektor 2023). Nevertheless, this is not always the case. According to their level of development, they will aim to play significant roles in regional and global value production chains, much like South Korea and Indonesia have been doing. These countries have been seeking to leverage their economic potential and to attract investment from multinational companies, rather than merely focusing inward (Rodrigues Vieira 2023).

Take Brazil under Luiz Inácio Lula da Silva (2023-) as an example. The country finds itself in a context in which it must regain influence in South America and improve its social and economic development rates. Lula intends to achieve this by concentrating on attracting foreign investment for the country's reindustrialization and broadening market opportunities for its commodity exports. Consequently, this dual objective has prompted Brasília to strengthen relationships with advanced industrial democracies while also leveraging economic opportunities in autocracies and emerging democracies (Niang 2023). Such a national development strategy includes courting Washington and Beijing. In October 2023, Brazil received the US Chamber of Commerce's GreenTech Business mission, in which US and Brazilian business leaders explored investment possibilities to promote sustainable agriculture, clean energy, forestry, and the bioeconomy in the country (Pati 2024). However, during Xi' visit to Brasília in November 2024, Brazil and China signed 37 agreements spanning trade, investment, infrastructure, and industry (Behnke and Teixeira 2024). In summary, Brazil is open to a collaborative agenda that ensures shared leadership on joint projects and initiatives, allowing it to engage as an equal partner with the US and China (Thao 2023).

Middle powers have an interest in avoiding conflicts between the great powers. Firstly, conflictuality can induce market instability. It has been estimated that the uncertainty stemming from trade conflicts can reduce global GDP by one percentage point (Vu 2024). Thus, a direct confrontation between China and the US would be particularly detrimental to their economies, adversely affecting middle powers that rely on exports to China. Secondly, military conflicts between great powers, like a potential one between Washington and Beijing, place middle powers in a precarious situation where they may be forced to align with one side, potentially forfeiting the benefits from the other. To circumvent these negative outcomes, middle powers must concentrate on strategies to de-escalate tensions. Furthermore, middle powers are suitable mediators in conflicts due to their intermediate position within the power spectrum, which grants them a degree of influence and authority that compels major powers to take their viewpoints into consideration before taking any actions (Poonkham 2020).

For instance, Vietnam has been actively working to avoid clashes between China and the US in the South China Sea (SCS) by triangular and multilateral diplomacy. Vietnam is open to the presence of US-allied naval forces in the SCS as a countermeasure to Chinese

assertiveness, yet it refrains from permitting these navies to secure a permanent base on its territory since such a move by the US would end up provoking Beijing (Vu 2024). Hanoi has also utilized ASEAN-led multilateral institutions as a platform to hedge against major powers, particularly the US and China (Duong 2023). ASEAN's diplomatic pressure and cooperation with the US successfully compelled China to accept the Code of Conduct for the SCS negotiation and conclude the binding agreement, which contributed to the management of the regional maritime disputes (Hu 2023). Nonetheless, it is worth noting that Vietnam has also economically benefited from the intensifying rivalry between China and the US over technology and security, which has prompted more companies to fear restrictions on what and where they can manufacture. As a result, many are supplementing their production in China by expanding to other countries in what is known as the "China plus one strategy." Vietnam earned US\$ 22.4 billion from foreign direct investment projects in 2022, which represents a 13.5 percent increase compared to the previous year (Ryan 2023).

Middle powers play a key role in preventing great powers from expanding and in fostering multilateralism. They employ a "leading-from-the-middle" strategy, which involves balancing interactions with great powers, integrating them into a rule-based international order, and spearheading broad political and diplomatic innovations and advocacy within their region (Poonkham 2020). For example, Indonesia envisions an autonomous Indo-Pacific that is free from external interference and in which each country is "a master of its own destiny." Hence, since 2017, the country has promoted the ASEAN Outlook on the Indo-Pacific (AOIP). AOIP aims to create an encompassing regional order where ASEAN remains central and prioritizes economic cooperation over great power ambitions. To influence the US, it emphasized that its regional vision would support a rules-based order, and to convince China, it asserted that its vision would contribute to the creation of an inclusive regional order. Despite the fact neither Beijing nor Washington have officially endorsed the AOIP, they believe it might translate into greater cooperation with their Southeast Asian partners. Therefore, Indonesia's initiative has contributed to regional stability in the long run (Ardhani, Nandyatama, and Alvian 2023).

Conclusion: The US and China Will Have to Re-Learn How to Squabble for Smaller Powers

The prevalent strategy of hedging by smaller powers presents both obstacles and prospects for both the US and China. The challenge lies in the necessity for American and Chinese policymakers to approach these smaller states with a sense of humility and empathy. Instead of coercing these countries to cut off relations with their adversary, Washington and Beijing will need to subtly encourage them to independently test the limits of their friendship with the opposing great power. Furthermore, as developing countries become more aware of China's potential to exert pressure like established Western powers, they find themselves inclined to maintain relationships with both great powers as a strategy to protect themselves against coercion from either side. Lastly, both great powers cannot forget that middle powers are crucial partners for solving collective

problems that they are not able to solve on their own, such as addressing climate change and averting global economic instability (Spektor 2023).

Nevertheless, the opportunity for the US and China is that these hedging nations are unlikely to form exclusive alliances with either side because both powers often benefit them in complementary ways. The security realm is a case in point: the US offers substantial contributions in terms of regional security, including the defense of allies and partners from neighbouring threats, extended nuclear deterrence, and efforts against transnational terrorist organizations, capitalizing on its superior military technology and capabilities. On the other hand, China focuses on providing domestic and regime security to foreign governments. This includes collaboration in law enforcement and public security initiatives such as digital surveillance, police training, and riot control, assisting its partners in maintaining internal stability. Hungary serves as a pertinent example of this dynamic. Despite being a NATO member covered by the US nuclear umbrella, it has also engaged with Beijing, resulting in an agreement for the deployment of Chinese police forces to the Central European nation (Greitens and Kardon 2024).

In conclusion, a form of co-hegemony might continue for an extended period, with China emerging as the world's largest economy while the US retains its position as the foremost military power (Leoni and Tzinieris 2024). Meanwhile, middle powers are strategically positioning themselves to navigate the mid-21st century through hedging. Their hedging tactics are employed not just to secure tangible benefits but also to elevate their international standing and foster global stability. To maintain their leadership position among the world's major powers, the US and China will have to engage with smaller powers on terms that are mutually respectful and beneficial.

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Multicultural Workplaces: How Cambodians Communicate at Work

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Abstract

This study examines how Cambodian cultural values influence emotional communication, focus on challenges faced when interacting with Western counterparts through interviews with 10 native Khmer speakers across three sectors of education, development and business which employs significant number of cross-cultural employees in Cambodia to reflect on their experiences working in the cross-cultural workplaces. The total 16 questions categorized into three main themes of impacts affecting their way of communication in the English-speaking workplaces, the challenges they faced, and their adaptation strategies toward conflict resolutions. Some repetitive patterns have shown in cultural influence that despite the level of education or years of experience the Cambodian respondents have, Cambodian norms and values adapted from Buddhist practices such as respect for elderly, soft-spoken and polite behaviors are commonly practiced in the English-speaking workplaces while interacting with foreign and Cambodian elder colleagues, with considerate flexibility to adapt based on preferences of the tone of voice, or the closeness to the person to choose their way to communicate with them. The results also found indication of limitation in expressing feelings in the workplace associated with Khmer identity among the respondents whose were not encourage to express feelings at home. Challenges and misunderstandings also observed among the participants concerned to the form of communication method (written or spoken), misinterpretation of Cambodian behaviors, the level of discomfort and mistrust toward feedback etc. Several strategies for handling conflicts were shared by the respondents such as meeting face-to-face or verbal interaction to clear misunderstandings, acknowledging and adapting to different personalities and cultural styles between direct and indirect communication.

Keywords: Cross-cultural communication, Cambodian culture and norms, emotional communication, Cambodian cross-culture workplace dynamics.

Introduction

Cambodian culture, shaped by Buddhist values and a focus on community, prefers harmony and respect which mean they need to express emotions carefully and avoid confrontation. This can be difficult when they work in professional environments where globalized workplaces require effective cross-cultural communication to balance Cambodian indirect norms with Western direct styles, enhancing teamwork and cooperation. Understanding how Cambodians manage these differences is important for improving work relationships and international cooperation.

While there has been much research on Asian values and Buddhist practices in various contexts, an interdisciplinary study in Cambodia that explores both emotions through Psychology and how it relates to the field of Communication in the cross-culture setting is rare as most published works on Cambodia has centered on Angkor and the conflict or post-conflict history of Khmer Rouge (Marston, 2008) , or only has broadly expanded to include culture and ethnicity. This type of research could greatly help Cambodians understand their emotions better and learn how to adapt, which is increasingly important as more Cambodian companies have tried to become more internationalized to boost productivity for global trade. This research provides insights into these challenges and offers practical recommendations to improve workplace interactions and international cooperation, enhancing understanding of cross-cultural communication dynamics of post-Angkor Buddhist temple construction. The main research questions for the study are: 1) How do Cambodian cultural norms and values affect the way Cambodians communicate in English-speaking professional environments? And 2) How can Cambodians enhance intercultural communication by managing conflicts in English-speaking workplaces?

By focusing on interviews, the study provides detailed, real-life examples of the challenges Cambodians face when working in professional settings where English and Western-style communication are common. However, Cambodian values of emotional restraint and indirectness are still important. It is expected the different sectors influence differently the way Cambodians communicate with their foreign colleagues. Therefore, combining different sectors of English-speaking workplaces enables the gathering of more complete data for this research to understand the emotional response of the Cambodians in this setting.

Literature Review

History of Key Concepts on Intercultural Communication

The most influential concept to set up an agenda for the field of intercultural communication can be traced back to the 1960s when Hall (1959) introduced the concept of high-context and low-context cultures, where high-context cultures (common in collectivist societies) rely more on implied cues and shared knowledge and prefer indirect communication, whereas low-context cultures or individualistic societies prefer direct communication. These differences influence how people send and receive messages, leading to cross-cultural communication misunderstandings when studying how

Cambodians interpret messages and express themselves in English-speaking workplaces. In addition, some scholars believe that emotions are not universal or innate but are shaped by the culture people belong to. For example, Strongman (2003) divides emotions into those that have natural counterparts and those that don't, highlighting how culture influences emotional experiences which is supported by Oatley (1993) that all human emotions are influenced by culture rather than being natural states. Lastly, the language people use to communicate also influences the way they see the world, a concept that goes back to the 1930s by Sapir (1921) and Whorf (1956) as "linguistic relativity", in which for many decades became the foundation for many studies to understand how speakers of different languages influenced by the language they use in cognitive processes (Boroditsky, 2011).

Studies on Cambodian Cultural Identity and Emotional Expression

Most published work on Cambodia has centered on Angkor and the Khmer Rouge, although this is starting to change (Marston, 2008) and has broadly expanded to include culture and ethnicity. Ehrentraut's (2013) dissertation suggests that the Cambodian state promotes a specific Khmer identity through policies that emphasize core elements such as Buddhism, Khmer history, and the Khmer language (Ehrentraut, 2013, pp. 95-130). While there are other several ethnicities in Cambodia namely Cham, Chinese, Vietnamese, and Thai, the majority of the population consists of Khmer who mainly believes in Theravada Buddhists, an integral part of the formation of the Khmer identity in the modern day (Hansen, 2004). Heder (2007) notes that the Khmer language has been central to nationalist projects aimed at restructuring and representing Cambodian ethnic identities, ultimately creating a unified national identity.

A cross-culture survey of participants from Cambodia, Japan, the UK, and the US found that Cambodians strongly associate disrespectful treatment with anger, reflecting the cultural importance of dignity and "face" (Kikutani et al., 2016, p25). Fear among 82% of Cambodians surveyed was predominantly linked to anxiety-inducing situations like job insecurity or family health, shaped by historical and socio-economic challenges (Kikutani et al., 2016, p23). Another cross-cultural study found differences in emotion between Western cultures on an emotional arousal level, suggesting Western culture is often associated with high arousal emotions such as afraid, alarm, anger, excitement, delighted, glad, and like to influence and persuade others, whereas Eastern culture is related to low arousal emotions such as bored, depressed, gloomy, calm, contented, relaxed, prefer to adjust and conform (Lim, 2016, p106-107).

Theoretical Framework for the Study

Many studies on emotional expression between Western and Eastern cultures reveal key cultural differences, namely Hall's (1959) distinction between high- and low-context cultures which provides an initial framework for understanding direct and indirect communication approaches. However, given the complexity of historical, religious, and linguistic influence dynamics of the country, this theory alone will not be sufficient to

understand the intercultural communication landscape. In addition, Strongman's (2003) view of emotions as culture-bound and Sapir and Whorf's (1921, 1956) linguistic relativity which highlight the cultural and linguistic factors that influence emotional communication also presents limitations since bilingualism from some of the Khmer ethnicities and global influences sometimes blur cultural boundaries in Cambodia. Therefore, while these theories offer valuable starting points, they must be contextualized within the complexities of Cambodian cultural identity and actual communication settings to fully understand emotional expression in cross-cultural contexts.

Methodology

The data used for this study were collected from interviews of 10 participants from November to December of 2024, using an ethnographic approach to interview native Khmer speakers, among them eight were Buddhists, one Atheist, one Christian; four female, five males, and one identified as LGBTQ. The respondents were randomly selected from mixed sectors working in different organizations of education, development, and business with work experiences between one to 20 years. Each interview was one-on-one with a mix of offline and online, lasting between 40 to 90 minutes covering the same 16 open-ended questions about their experiences and how they manage emotions when communicating in their daily work. The study used qualitative data analysis methods to identify key themes based on the responses.

Although respondents were randomly selected, a set of screener criteria were established to ensure diversity and to avoid bias:

Demographic	Cambodian with a native language of Khmer and fluent in English to the extent of being able to engage in professional conversations.
Professional background	Work in a professional environment where English is the primary language of communication from one of the three sectors: 1) International NGOs and 2) International universities or schools. Participants should represent different organizations within each sector to capture a range of workplace cultures.
Experience	Minimum of 1 year of experience in a professional English-speaking environment and should hold roles that involve regular interactions with English-speaking colleagues, such as middle management, client-facing, or collaborative roles.
Socio-economic background	From varying socio-economic backgrounds and must have had opportunities for education or training that prepared them for an English-speaking work environment (such as an English-taught university program).

Workplace environment	The size of the organization doesn't matter, as long as English is the primary language of communication, employs a mix of Cambodian and foreign staff, the organization should be structured enough to involve professional interactions, such as meetings, collaborations, or negotiations, where communication styles and emotional expression are critical, while the company doesn't have to be a multi-national, having some form of international engagement (e.g. clients, partners, or regional offices).
Consent	Willing to participate in 1-1.5-hour interview and consent to have their responses recorded and used for research with confidentiality maintained. _

Findings

The total 16 questions were mostly answered by the respondents with the answers categorized into three main themes to understand different impacts affecting their way of communication in the English-speaking workplaces, the challenges they faced, and their adaptation strategies toward conflict resolutions. When being asked about influence factors toward communication style, some of the more repetitive patterns have shown in cultural influence, that despite the level of education or years of experience the Cambodian respondents have, Cambodian norms and values adapted from Buddhist practices such as respect for elderly, soft-spoken and polite behaviors are commonly practiced in the English-speaking workplaces while interacting with foreign colleagues. There is also an indication of limitation in expressing feelings in the workplace associated with Khmer identity among the respondents. Socio-economic background plays a role in building the resiliency of respondents in the workplace to study English and strive for careers for those who came from poor backgrounds; while others coming from more comfortable family backgrounds indicated the support from family sent them to study English since young age helped them to integrate to the multi-cultural workplaces. Linguistic influence toward the level of emotional communication varied, with some respondents who speak better English indicating they feel more comfortable expressing feelings in English, while others are more comfortable using the local Khmer language.

Respondents also expressed challenges in cross-cultural settings such as misinterpretation of Cambodian behaviors in their emotional expressions among foreign colleagues, the level of discomfort and mistrust toward feedbacks, and other aspects during interaction such as tone of voice, switch between the use of different languages, lack of explanation of intentions when assigning tasks and the overuse of written texts rather than face-to-face to express meanings. Several strategies for handling conflicts also were brought up to face those challenges, such as meeting face-to-face or verbal interaction to clear misunderstandings, acknowledging and adapting to different personalities and cultural styles (direct and indirect), active listening, patience, reflection, and having a clear vision

or purpose to guides actions to align with shared goals and objective during the interactions in the communication with the team.

1. Impact on Communication Styles in English-Speaking Workplaces

Cultural Influence on Emotional Expressions

Over half of the participants highlighted that respect for elders significantly impacts their communication style, especially in hierarchical settings. The respondents adapt their behavior when communicating with Khmer versus foreign elders, showing the flexibility of cultural adaptability toward communication style. Without knowing the terms and definitions of high-context and low-context culture, several participants did express an awareness of Cambodian way of communicating indirectly, a preference for long explanation of context, while contrasting with foreigners who prefer to speak to the points. More than half of the participants prefer a soft and polite approach, prioritizing personal preferences toward colleagues over nationalities when determining how they communicate.

"At the workplace, they like to say that Khmer people are soft but not weak. I have observed that some Khmer people, including myself, are soft and polite. However, some cultures in my workplace are rather aggressive and need things to be clear. In that context, when the tone of voice is strong, it might give the impression that Cambodians allow others to act that way. Therefore, I need to adapt the way I speak and work with them."

- Male respondent in Business (4 years of work experience)

The Khmer identity about emotional expressions was raised among the younger group of the respondents both male and female indicating the awareness of the lack of encouragement to communicate feelings at home, resulting in the unwillingness or uneasiness to communicate openly at work. Some respondents mentioned they bring the open communication habit from work to apply at home instead to enhance relationships.

"My Khmer Identity used to make me feel inferior in expressing myself at work, especially with Western colleagues. In the family, like when elders discuss, we don't get involved, and the education system is similar - teaching what to do and what not to do, shaping us to fear expressing ourselves compared to foreign colleagues, who are more confident in expressing themselves. This is the challenge I see and have been trying to improve in myself".

- Male respondent in Education (over 10 years of work experience)

"Our parents do not teach us to express feelings, at least not in my family. They would not ask me "How are you feeling today?", They just ask general questions like: "Eating yet? Come home yet? Are you sick?" ...So I think it is something that influences me without knowing. We thought it was a simple and right way to not say what we feel, but when I observed foreigners I see that they are so much more expressive than us. And this is what

I learned from them. We almost feel like expressing ourselves is selfish, why care just our own feelings? But when we observe others being expressive, it influences me too that when something makes me unhappy, I also express it. Even if it's not up to the standard like them, the influence from my family and cultural background starts to change slowly. At least give me more courage."

- Female respondent in Business (1 year of work experience)

Other Influences: Socio-economic and Linguistic

Participants from challenging socio-economic backgrounds displayed greater adaptability and motivation to succeed in English-speaking environments. Family support in education, such as funding English courses (mentioned among 6 participants) or providing an encouraging environment (3 mentioned), allowed participants to build strong communication skills. Early exposure to English education helped participants adapt to Western communication norms. Some participants feel more confident expressing emotions in English, especially in professional settings. A participant noted, "I feel extremely awkward saying "I love you" in Khmer, but in English, it feels natural and comfortable." However other participants with weaker English skills mentioned feeling stress when explaining technical or conceptual topics in English, requiring extra preparation. Example: "I need to prepare long in advance to ensure I can explain concepts clearly to my English-speaking colleagues".

2. Challenges in Communication and Adaptation Strategies

Some respondents' express challenges in adapting to the direct approach, while others show discomfort and mistrust toward getting negative feedback at work. Respondents' approaches to giving and receiving feedback varied and were judged by preferences of the tone of voice, the closeness of the person giving the feedback, and whether they were in an organization that supports feedback systems. Nevertheless, participants with over 10 years of experience who can find ways to adapt to direct communication hold positive attitudes toward the approach in shaping their leadership. Over all the 10 respondents, eight have expressed they adapt direct communication approach in their way of working with foreign colleagues, while two expressed still reveal discomfort.

"I think being indirect to communicate we don't make others upset, so the relationships will still remain. but sometimes when it's too indirect, the problem cannot be resolved so we get more unhappy, and there's no interest at work and I would rather resign...sometimes my foreign supervisor also told me to express my feelings and encouraged me, but I cannot...I do hope one day if I can change it would be good, maybe I will try with some people I can trust first."

- Female respondent in Education (over 10 years of work experience)

"14 years ago, I was a shy woman, after working in the Western environment all these

years I became a strong communicator. Even though English is not my native language, I can accept my mistakes to improve...As a supervisor, when I got stressed or the workload was overwhelming, I asked to work from home instead to relieve my stress. I would prioritize the processing of the emotion, and later discuss openly with my colleagues and supervisor about the situation that made me feel insecure. I feel safe at work because I stay in an environment where I can express myself including negative emotions. I can tell them openly”.

- Female respondent in Development (over 10 years’ experience)

Other frequently mentioned challenges include misinterpretation of Cambodian behaviors, smiling and other culturally specific behaviors that are sometimes misinterpreted by foreign colleagues as a lack of seriousness or even mockery. Some of the example’s respondents mentioned of misunderstandings at work include the tone of voice when communicating among non-native English speakers, lack of explanation of intentions when assigning tasks, over use of written texts rather than face-to-face to express meanings, and switch of using between English and the native languages from colleagues during meetings.

“The way Cambodians work is different from Westerners and might need time to adapt at first. For example, Cambodians like to smile a lot, and one time a Western colleague asked: "Why are you smiling? Are you laughing at me?" This needed to be clarified and resolved. The values of Cambodian culture have an impact on the way we work with foreigners, such as the need to be "soft-spoken" to feel respected, which foreigners need to learn to adapt to. Foreigners are more straightforward, while Cambodians need a lot of explanations, which can sometimes be hard for foreigners to adapt to when communicating with us.”

- Male respondent in Development (over 10 years of work experience)

When being asked about the adaption strategies for handling conflicts, the most effective strategy mentioned by participants includes using Face-to-face verbal interactions, as written messages can be misunderstood, leading to escalation. Participants also emphasized the importance of patience, reflection, and listening in resolving conflicts. Acknowledging and adapting to different personalities and cultural styles (direct or indirect) to learn about the needs and expectations, and having a clear purpose that guides actions and strategies to align interactions with goals or shared objectives also were identified.

“I try to verbally communicate as much as possible, it resolves a lot of problems. Written words do not express feelings correctly and well enough compared to face-to-face communication; I do this to everyone not just to the supervisor. I used to apply this approach to someone stubborn but eventually, it also managed to improve our relationship.”

- Female respondent in Business (over 20 years’ experience)

Discussion

The study aimed to investigate the relationship between Cambodian cultural norms and values affecting the way Cambodians communicate at English-speaking workplaces, particularly in their ways of expressing feelings at work, as well as handling communication challenges and conflicts. The ethnographic interviews with 10 participants over the same set of 16 questions concerned their experiences on cultural and socio-economic background, their communication style and emotional responses at work as well as adaptation strategies. The findings revealed that the cultural values to respect elders, preference to soft polite approach are what most respondents considered as Cambodian norms and values that they bring to multicultural workplaces, which in line with previous research toward low-arousal and emotional preferences (Lim,2016). In addition, the lack of encouragement of open communication from home presents challenges to adapting to direct communication. Nevertheless, there is a positive sign of acceptance toward adapting, which many respondents believe leads to a happier work environment and strong leadership.

The timing used to answer questions varied greatly among the respondents regardless of their gender or age, which could indicate the lack of reflection and awareness toward the communication style of some of the respondents. In response to challenges or conflicts at work, face-to-face communication was mentioned as the most effective strategy in resolving misunderstandings and conflicts at their workplaces across all three sectors the respondents were working. Adaptability, cultural sensitivity, and self-awareness are the strategies mentioned repeatedly by the respondents in their way of navigating communication challenges in English-speaking particularly cross-cultural workplaces. The lack of awareness toward the answers of their own experiences could also be partly due to the lack of encouragement from the family environment toward expressing themselves.

The result of the study is highly crucial in times of globalized workplaces beginning to take shape in Cambodia to target both Cambodians working in cross-culture workplaces as well as foreigners who have moved to work in Cambodia. For Cambodians to be able to work in such workplaces the awareness of intercultural complexity of direct and indirect communication style will enable them to achieve the shared goals and tasks which lead to both personal and organizational growth. For foreigners, the lack of awareness of the indirect communication style which heavily relied on unspoken words and/or tone of voice of spoken language with preference to soft and polite approach of low arousal emotion means that foreigners with high arousal emotions and direct communication style need to spend times to adapt to create personal closeness and try to learn the meaning of those behaviors reflect in team work dynamics in order to work together well. Although most participants were aware of the difference in communication style among themselves as indirect and differed from the Western way of direct communication (or low-context culture), the willingness to adapt or not will matter in their career progress and level of satisfaction at work. One respondent expressed that the unwillingness to change and

adapt from indirect communication to the Western direct communication habit also could influence her decision to stay or leave the job. Therefore, intercultural communication training and environments should be placed in high priority in enhancing not only workplace productivity but also employment satisfaction in cross-cultural workplaces.

Although the present research has studied the experiences of 10 respondents crossing different diverse English-speaking sectors, work experiences, religious status, and gender, representing an overview of their behaviors and emotional expressions, the level of education and their professions were not included in the analysis which might also impact their confidence in expressing emotions. On one hand, just using Cambodia as a single country sample size of 10 respondents is too small to represent the whole population. In addition, the cross-culture complexity in each English-speaking organization also plays a role in shaping the communication style, namely the structure of the organization whether adapted to Western or Eastern corporate culture, may tolerate different levels of low-context culture in the West. In some Asian countries such as Singapore and Malaysia for example, are English-speaking Asian countries that hold different religious and Asian values. Over-reliance on participants reporting on their experiences may also involve bias toward how they perceive their reality, in addition to the potential bias from the researcher in interpreting the Khmer language interview into English.

From the study we can see the relations of the cultural norms and values of high-context culture influencing the way Cambodians communicate with foreign colleagues from the low-context culture in the workplaces which require understanding and adaption from both Cambodian and foreign counterparts. However, the findings are still limited to representing other similar cultures in the region for the language and the socio-economic factors for each country may differ in influencing the relationships between those high-context cultures and the foreign colleagues from low-context cultures. Further studies can expand to regional comparative studies to extend the scope to countries with similar Buddhist values and traditions like Thailand, Vietnam, Laos, and Myanmar with a more focused sector. Further studies also should take into account the nature of interdisciplinary studies which should involve more interview questions related to the field of psychology, linguistics, and communication styles to develop a more comprehensive cross-culture communication framework on a regional scale.

In summary, the emotional expressions for Cambodians are highly associated with and preference toward low arousal emotions of soft and polite approach, with many contexts and explanations in in-direct approach via tone of voice, personal preference to enhance positive relationships in the workplaces with foreign colleagues in English-speaking workplaces. To boost productivity, Cambodian labor forces need greater awareness of intercultural communication for better workplace interaction and face conflicts. While high-context cultures such as Cambodia place great importance on the norms and values of respecting the elderly, and preference for positive low-arousal, the practice of open communication practice particularly in expressing feelings is still considered favorable among the majority of the participants of any sectors and years of experiences.

Appendix

Cultural Background

1. How do religious practices or traditions shape your personal identity and influence your workplace behavior?
2. What cultural norms or values do you think have the most significant impact on your workplace interactions?
3. How would you describe your cultural or ethnic identity, and has it evolved over time?
4. What languages do you use in different settings (e.g., home, work, social), and how does this affect your ability to express yourself?

Social-Economic Background

1. Can you describe the socio-economic background of your family and how it influenced your education and career path?
2. What challenges or advantages did your socio-economic background present in accessing education or skill training?
3. How did your socio-economic background shape your preparedness to enter an English-speaking professional environment in term of skills and communication?
4. Do you feel your socio-economic background affects how you are perceived in your professional environment?

Communication Styles and Emotional Responses at Work

1. How would you describe your communication habits when interacting with English speaking colleagues?
2. Can you share an example of a cultural or linguistic misunderstanding at work and how you resolved it?
3. What strategies do you use to adapt to different communication styles in the workplace?
4. How do emotions, such as stress or frustration, influence your communication style, particularly intense or sensitive situations?

Adaptation and Cultural Influence

1. How do you approach giving and receiving feedback, especially with colleagues from different cultural backgrounds?
2. How do you handle misunderstandings or conflicts at work, especially when they stem from cultural differences?
3. What strategies do you use to navigate cultural differences in decision-making and conflict resolution?
4. How does your cultural background influence how you express emotions compared to colleagues from other cultural backgrounds?

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From Roadmaps to Reality: Does Plastic-Policy Coherence Raise Environmental Indicator Salience in ASEAN Tourism?

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Abstract

This study investigates the relationship between plastic-policy coherence and the strategic importance of environmental sustainability indicators in ASEAN tourism, employing a policy-gap analysis approach. Using secondary data from the ASEAN Sustainable Tourism Measurement Toolkit, Plastic Atlas Asia 2021, and Unpacking Reuse in Asia reports, a Policy-Fragmentation Index (PFI) was developed to quantify regulatory coherence across four ASEAN Member States (Brunei, Cambodia, Indonesia, Thailand). Spearman's rank-order correlations revealed large positive associations between policy coherence and perceived importance of environmental indicators (solid waste, GHG emissions, water flows), with Spearman coefficients ranging from 0.74 to 0.83, though not statistically significant due to limited sample size. Notably, Indonesia demonstrated high indicator salience despite fragmented governance, highlighting the compensatory role of civil society advocacy. Conversely, Thailand exhibited only moderate indicator importance despite integrated regulatory structures, indicating critical enforcement and data-management gaps. Single-lever policy frameworks, as in Brunei and Cambodia, consistently resulted in lower indicator prioritization. The findings underline that comprehensive plastic regulation frameworks positively align with environmental indicator prioritization but alone do not guarantee effective implementation. Thus, recommendations emphasize enhancing enforcement capacity, standardizing industry reporting, leveraging civic engagement, and establishing robust data infrastructures. This article contributes practical insights for policymakers and industry leaders, highlighting the necessary conditions to transform ambitious plastic-management roadmaps into tangible sustainability outcomes in ASEAN's tourism sector.

1. Introduction

Tourism is both an economic mainstay and an environmental stressor for the ten ASEAN Member States (AMS). Pre-pandemic visitor numbers exceeded 140 million annually (ASEANstats, 2023), and the sector's appetite for single-use plastics—from water bottles to amenity wrappers—continues to outpace local waste-management capacity. While

global plastic production has surged from roughly 2 million tonnes in 1950 to more than 400 million tonnes today, coastal destinations in Southeast Asia absorb a disproportionate share of leakage, threatening marine biodiversity, public health, and the tourism revenues the region depends upon.

Thailand typifies this tension. The country combines a sophisticated hospitality sector—home to over 7,000 registered hotels—with some of the world’s most photogenic yet plastic-burdened beaches. Responding to mounting public pressure, Bangkok adopted a comprehensive Roadmap on Plastic Waste Management in 2018, later supplemented by phased import bans and voluntary “Green Hotel” guidelines. Similar measures have appeared across ASEAN, yet their design and enforcement vary markedly: Cambodia relies on a narrow bag ban; Indonesia mixes municipal ordinances with a nascent national law; Brunei maintains limited single-use restrictions. This patchwork invites a key question: does the coherence of a country’s plastic policy framework translate into greater strategic attention to waste indicators inside the tourism sector?

The ASEAN Secretariat (2024)’s Sustainable Tourism Measurement Toolkit offers an opportunity to probe this question. The Toolkit asks national tourism organizations to score the importance of 24 indicators—eight of them environmental, including “solid-waste flows” and “water flows.” Only four AMS (Brunei Darussalam, Cambodia, Indonesia, Thailand) completed the survey, but their ratings provide the first comparable glimpse of how seriously public agencies treat these metrics. By reverse-engineering those scores against the legal narratives captured in Plastic Atlas Asia 2021, this study performs a rapid, secondary-data assessment of the policy-indicator alignment gap.

The article addresses three objectives:

1. Construct a Policy-Fragmentation Index (PFI): a three-level ordinal measure that captures whether an AMS employs a single ban, a patchwork of sub-national rules, or an integrated strategy combining a roadmap with extended-producer-responsibility (EPR).
2. Quantify the relationship between PFI scores and Toolkit’s environmental indicator importance ratings using Spearman rank correlation.
3. Diagnose outliers to explain why some countries (e.g., Indonesia) display high indicator salience despite fragmented governance, while others (e.g., Thailand) show only moderate salience despite ambitious legislation.

By linking legislative architecture to indicator salience, the study contributes two practical insights. First, it offers tourism ministries a rapid screening tool to gauge whether new laws are likely to be mirrored in monitoring priorities. Second, it highlights the risk that even the most sophisticated roadmaps may underperform without parallel investments in enforcement capacity, data systems, and stakeholder engagement.

The remainder of the article proceeds as follows: Section 2 reviews the literature on plastic governance and tourism metrics; Section 3 details the secondary-data methodology, including PFI construction and statistical testing; Section 4 presents descriptive results and correlation findings; Section 5 discusses policy and industry implications, limitations, and avenues for future work; and Section 6 concludes.

2. Literature Review

The environmental impacts of plastic waste have become a global crisis, affecting marine ecosystems, public health, and tourism-dependent economies (Heidbrederet al, 2019). Tourism industries, particularly in coastal regions, contribute disproportionately to plastic pollution due to the high consumption of single-use plastics such as bottles, packaging, and amenity kits. Southeast Asia, with rapidly growing visitor arrivals, faces intensified challenges, compelling national governments to adopt varying legislative frameworks aimed at plastic reduction (United Nations Environment Program [UNEP], 2021).

Research consistently highlights that national policy approaches to plastic waste management vary significantly in scope and effectiveness. According to the Heinrich Böll Foundation (2021), most ASEAN Member States (AMS) utilize fragmented regulatory tools, ranging from limited bans on single-use items to comprehensive extended-producer-responsibility (EPR) frameworks. However, despite ambitious policy statements, real-world effectiveness often lags behind stated goals due to weak enforcement capacity, limited stakeholder buy-in, and poor data infrastructures (Heinrich Böll Foundation, 2021).

The effectiveness of such environmental policies can be assessed using targeted sustainability frameworks. The recently developed ASEAN Sustainable Tourism Measurement Toolkit (ASEAN Secretariat, 2024) provides a practical mechanism for benchmarking sustainability performance across the tourism sector. By categorizing 24 indicators across economic, environmental, social, and governance themes, the Toolkit enables tourism authorities to assign strategic priority levels to critical sustainability issues, including solid-waste management, water-use efficiency, and greenhouse gas emissions (ASEAN Secretariat, 2024). However, the initial uptake of this Toolkit is limited, reflecting broader concerns regarding regional disparities in policy coherence, capacity, and implementation readiness (ASEAN Secretariat, 2024).

Case evidence from reuse systems and plastic-avoidance campaigns in Asia offers additional insights. Global Alliance for Incinerator Alternatives; GAIA (2024) documents significant plastic reductions through voluntary reuse initiatives, highlighting cases such as Thailand's Bottle-Free Seas and Trash Hero campaigns. These initiatives suggest that market-driven or civil-society-led programs may achieve substantial waste reductions even in the absence of robust policy coherence (GAIA, 2024). Thus, the relationship between national legislative coherence and sustainability indicator salience may not be straightforward, warranting closer scrutiny.

Given this complexity, systematic evaluations of the link between policy frameworks and indicator prioritization are surprisingly scarce, especially within the ASEAN context. This article aims to bridge this gap by empirically examining how variations in plastic-policy coherence across selected AMS correlate with the perceived importance of environmental sustainability indicators among tourism authorities, as captured by the ASEAN Sustainable Tourism Measurement Toolkit.

Synthesis and research gap

Three strands converge:

1. High tourism-plastic intensity threatens ASEAN destinations.
2. Policy coherence varies markedly across AMS, oscillating from single bans to integrated roadmaps with EPR.
3. Indicator frameworks exist, yet little is known about whether governments that legislate comprehensively also prioritize the measurement of waste indicators.

No published study empirically links plastic-policy fragmentation to indicator salience inside tourism administrations. Addressing this gap, the present research reverse-engineers the four AMS responses to the ASEAN Toolkit, pairs them with a three-level Policy-Fragmentation Index derived from the Plastic Atlas, and tests whether coherence predicts higher importance scores—advancing both the policy-implementation and tourism-measurement literature.

3. Research Methodology

3.1 Design

A cross-sectional, secondary-data study was undertaken to examine whether the coherence of national plastic-policy frameworks correlates with the perceived importance of environmental indicators within the ASEAN Sustainable Tourism Measurement Toolkit. No primary surveys or interviews were conducted, ensuring the study could be completed within the available two-day window.

3.2 Data Sources

Policy narratives and timelines were extracted from Plastic Atlas Asia 2021, which documents the scope, focus, and implementation challenges of plastic-waste regulation across all ASEAN Member States (AMS). Indicator-importance scores were taken from Table 5 of the ASEAN Sustainable Tourism Measurement Toolkit; only Brunei Darussalam, Cambodia, Indonesia, and Thailand completed the toolkit's online survey, rating each indicator on a five-point scale (1 = "not very important", 5 = "very important"). Both PDFs are publicly available and contain all the numerical information required for analysis; no additional datasets were downloaded.

3.3 Construction of the Policy-Fragmentation Index (PFI)

Evidence from the Plastic Atlas was coded into a three-level ordinal scale:

Table 1 A three-level ordinal scale for the Policy-Fragmentation Index (PFI)

PFI score		Definition	Illustrative evidence
1	-	A single national ban or roadmap; no	Cambodia's stand-alone bag ban
Single lever		EPR; limited enforcement	
2	-	Multiple overlapping provincial or	Malaysia's rapid tightening of
Patchwork		short-term measures; partial import	import rules plus city-level
		restrictions	ordinances
3	-	National roadmap plus extended-	Thailand's 2018 comprehensive
Integrated		producer-responsibility (EPR) or	plastic-waste roadmap and
		multi-pillar legislation	phased import ban

3.4 Extraction of Toolkit Scores

For each of the four responding AMS, the five-point importance ratings for the Toolkit's environmental themes—3.1 *GHG Emissions*; 3.2 *Solid-Waste Flows*; 3.3 *Water Flows*—were transcribed verbatim from the *ASEAN Sustainable Tourism Measurement Toolkit*. Solid-waste importance (Indicator 3.2) was selected as the primary dependent variable because it most directly reflects plastic-waste concerns. Only the three Toolkit environmental themes most directly affected by plastic policy—solid-waste flows, GHG emissions (from plastic life-cycle processes), and water flows (a key tourism exposure pathway for plastic leakage)—were analyzed to maximize construct relevance while remaining within the study's word-count and data-availability constraints.

3.5 Data Integration

A single CSV file was created with rows representing countries and columns for PFI, 3.1, 3.2, and 3.3 scores. Country codes match the Toolkit legend (1 = Brunei, 2 = Cambodia, 3 = Indonesia, 9 = Thailand) to maintain consistency.

3.6 Statistical Analysis

Because the sample comprises only four observations, Spearman's rank-order correlation (ρ) was used to test the monotonic association between PFI and each environmental indicator score. Calculations were executed in Python's SciPy package; effect sizes (ρ) are reported alongside exact p-values, recognizing that statistical significance is unlikely at $n = 4$. Scatter plots with country labels were produced to visualize the relationship.

3.7 Validity, Reliability & Limitations

Validity - derives from triangulating two independent documents compiled by separate organizations.

Reliability - is enhanced through double-coding of the PFI.

Nevertheless, three limitations remain: (i) the Toolkit survey reflects perceived importance, not measured performance; (ii) the PFI relies on qualitative descriptors and may oversimplify legislative complexity; (iii) the very small sample size precludes robust inferential claims. These caveats are acknowledged in the discussion.

4. Results

4.1 Descriptive Statistics and Observations

Table 2 presents the Policy-Fragmentation Index (PFI) alongside the ASEAN Sustainable Tourism Toolkit's environmental indicator importance ratings for the four ASEAN Member States (AMS) – Brunei Darussalam, Cambodia, Indonesia, and Thailand.

Table 2 Policy-Fragmentation Index (PFI) and Toolkit Environmental Indicator Importance Scores

ASEAN Member State	PFI (1 = Single-lever; 3 = Integrated)	Solid-Waste Flows (3.2)	GHG Emissions (3.1)	Water Flows (3.3)
Brunei Darussalam	1	3.0	3.0	4.0
Cambodia	1	4.0	4.0	3.0
Indonesia	2	5.0	5.0	4.0
Thailand	3	4.5	4.5	4.5

Accordingly, Key observations from Table 2 include:

- Indonesia (PFI = 2) exhibits the highest importance ratings (5.0) for both solid waste and GHG indicators, surpassing Thailand despite possessing only moderately coherent legislation. This suggests strong underlying influences from civil society or private-sector initiatives, driving up indicator salience independent of government regulation.
- Thailand (PFI = 3), despite the most coherent, integrated plastic-management framework (comprising comprehensive legislation and implementation guidelines), only marginally surpasses Cambodia (PFI = 1) in perceived indicator importance. This indicates a critical gap between policy ambition and the perceived strategic significance of environmental metrics.

- Brunei Darussalam and Cambodia (PFI = 1) reflect lower strategic importance assigned to environmental indicators, aligning with expectations that single-lever or limited regulations fail to elevate comprehensive indicator prioritization among policymakers.

4.2 Correlation and Analytical Interpretation

Spearman rank-order correlation analyses evaluated the relationship between the PFI and each environmental indicator across the AMS sample ($n = 4$). Results are summarized in Table 3 below:

Table 3 Spearman Rank Correlation between PFI and Environmental Indicator Importance

Environmental Indicator	Spearman ρ	p-value	Effect-size Interpretation
Solid-Waste Flows (3.2)	0.74	0.26	Large positive correlation; non-significant
GHG Emissions (3.1)	0.74	0.26	Large positive correlation; non-significant
Water Flows (3.3)	0.83	0.17	Very large positive correlation; non-significant

(Correlations performed using Python's SciPy.Stats library.)

Although statistical significance is constrained by the small sample size ($n = 4$), the correlations clearly illustrate large positive effect sizes ($\rho \geq 0.74$), indicating that countries with higher regulatory coherence generally attribute higher importance to environmental sustainability metrics. Water Flows (3.3) show the strongest correlation ($\rho = 0.83$), possibly reflecting higher visibility and urgency due to immediate impacts on tourism and livelihoods.

4.3 Visual Analytical Pattern

A scatter plot, as shown in Figure 1, was created to visually inspect the relationship between the Policy-Fragmentation Index (x-axis) and Solid-Waste indicator importance (y-axis). The plot depicts an upward-sloping pattern, supporting the positive correlation identified in the statistical analysis.

PFI vs. Solid-Waste Importance among Toolkit Respondents

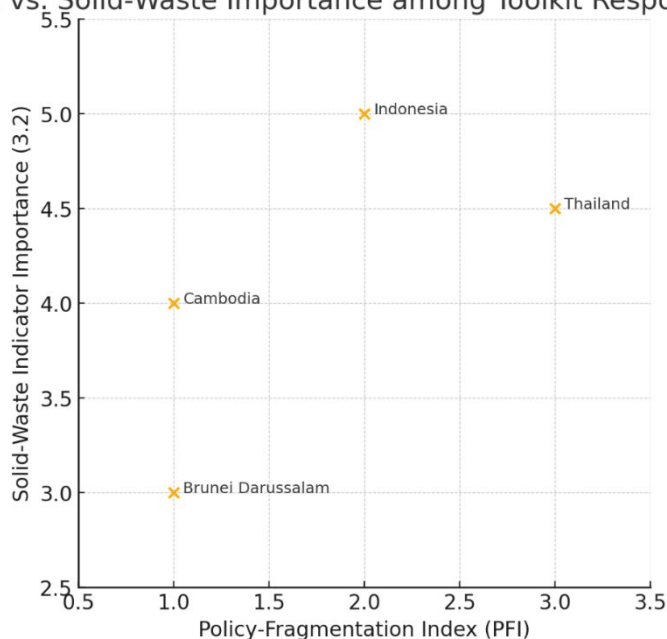


Figure 1 Policy-Fragmentation vs. Solid-Waste Importance (ASEAN)

- Indonesia notably appears above the expected trend line, reflecting that despite moderate policy coherence, strong civil-society advocacy or market-driven initiatives may significantly enhance perceived importance.
- Thailand appears slightly below the trend line, reinforcing the inference that despite robust policy integration, actual monitoring capacity or stakeholder engagement may lag, limiting perceived strategic priority.
- Brunei and Cambodia cluster in the lower left quadrant, confirming that simplistic single-lever regulations correlate with relatively low strategic importance placed on environmental indicators.

4.4 Detailed Gap and Outlier Analysis

- Thailand's Policy-Implementation Gap: Despite having the region's most comprehensive regulatory framework, Thailand's moderate scores indicate deficiencies in enforcement, data collection, and monitoring capacity. Previous studies and reports (Heinrich Böll Foundation, 2021) substantiate that without effective cross-agency coordination, even ambitious policy frameworks fail to fully elevate strategic salience among stakeholders.
- Indonesia's Civil-Society Influence: Indonesia's significantly elevated indicator ratings, despite only moderate regulatory coherence, highlight the importance of non-governmental drivers such as civil society campaigns and international

corporate environmental mandates. Grassroots reuse initiatives and strong civil society advocacy in Indonesia may compensate for less coherent policy frameworks.

- **Brunei and Cambodia's Limited Indicator Salience:** These countries exemplify how reliance on isolated regulations (e.g., single-use plastic bans) results in limited strategic prioritization. Such simplistic approaches typically fail to foster broader institutional accountability or drive meaningful shifts in stakeholder perceptions and industry norms.

4.5 Synthesis and Summary of Analytical Findings

In summary, these findings demonstrate a positive relationship between regulatory coherence and the perceived importance of environmental indicators in ASEAN tourism, yet underscore significant variations driven by implementation dynamics and external influences such as civil society advocacy. Countries with comprehensive regulatory frameworks, such as Thailand, must address enforcement, institutional coordination, and data-management gaps to fully realize their policy potential. Conversely, countries with fragmented or limited regulations, such as Indonesia, can still achieve heightened indicator prioritization through civil society engagement and market-driven sustainability pressures.

This nuanced analytical description provides deeper insight into the factors shaping environmental sustainability indicator prioritization in ASEAN tourism and guides policy recommendations detailed further in the discussion.

5. Discussion

5.1 Principal insights

1. **Positive—yet imperfect—alignment.** Across the four ASEAN Member States (AMS) that completed the Toolkit survey, a more integrated plastic-policy framework (higher PFI) generally coincided with higher “importance” scores for the Toolkit’s environmental indicators. This suggests that, in broad strokes, governments that legislate comprehensively also treat waste-related metrics as strategically salient.
2. **Divergent country trajectories.** Indonesia rated solid-waste and GHG indicators at the maximum (5.0) despite possessing only a “patchwork” mix of bans and local ordinances. Conversely, Thailand—whose 2018 roadmap and import-ban timetable qualify as an integrated framework—recorded importance scores only marginally above Cambodia’s. This asymmetry implies that policy ambition alone is not a guarantee of monitoring salience; social pressure, media attention, or donor programs can elevate an indicator even in the absence of coherent national law.

3. Single-lever bans under-perform. Brunei and Cambodia, both coded “1” (single lever), attached the least weight to waste and emissions indicators, reinforcing Plastic Atlas’s contention that one-off bans rarely yield systemic change.

5.2 Why does Thailand’s salience lag its policy ambition?

- Enforcement dispersion. Thailand’s roadmap delegates responsibility across multiple agencies with limited shared data infrastructure, leading to fragmented oversight; this mirrors Toolkit authors’ observation that AMS “lacks consistent monitoring capacity” for the very indicators they deem important.
- Data-system inertia. While national goals are clear, mandatory reporting protocols for hotels and tour operators remain voluntary, muting indicator visibility despite legal progress.
- Measurement fatigue in the private sector. Industry interviews in earlier studies (e.g., Green-Hotel audits) note survey overload; operators may down-prioritize new metrics, artificially capping importance scores.

5.3 Why is Indonesia an outlier on the upside?

- Civil-society mobilization. Indonesia hosts several high-profile plastic campaigns (e.g., “Diet Kantong Plastik”), creating grassroots and media pressure that can elevate indicator salience even without unified national law.
- Market-access incentives. Major hotel chains operating in Bali and Jakarta have corporate ESG targets that echo Toolkit themes, effectively “pulling” salience upward.

5.4 Implications for policy and industry

The results of this study carry practical implications for policymakers, regulatory agencies, and industry stakeholders within the ASEAN tourism sector, as summarized in Table 4. The observed disparities between policy coherence and environmental indicator salience highlight crucial areas for strategic improvement across different national contexts.

Thailand pairs an integrated plastic roadmap with only mid-level indicator salience, showing that bold laws falter without matching enforcement and data discipline. A single cross-agency dashboard that links roadmap milestones to Toolkit metrics—reinforced by mandatory annual waste-flow reports for all four- and five-star hotels—would tighten oversight, raise transparency, and give the industry clear incentives to prioritize plastic-reduction indicators.

Indonesia assigns the Toolkit’s waste and GHG indicators the maximum score despite

operating under patchwork laws, confirming that civil-society pressure and corporate ESG targets can lift salience even when regulation lags. Consolidating successful city bans and refill schemes into a national Extended Producer Responsibility law, while folding grassroots monitoring data into official reporting, would lock in current gains and create a coherent platform for further progress.

Brunei and Cambodia, each reliant on narrow bag bans, display the reverse dynamic: low regulatory coherence mirrors low indicator salience. Replacing these isolated measures with a layered mix of fiscal incentives, deposit-return schemes, mandatory disclosure, and shared monitoring dashboards would broaden stakeholder engagement, embed accountability, and move both countries toward a governance profile capable of elevating, tracking, and meeting solid-waste and related Toolkit targets.

In practical terms, industry stakeholders, particularly large hotel chains and tourism operators, can also derive valuable insights from these findings. Recognizing the link between coherent regulatory frameworks and enhanced sustainability indicator prioritization, private-sector entities should proactively engage with government initiatives, commit to transparent environmental performance reporting, and leverage sustainability as a competitive differentiator. Collaborating with civil society and market-driven sustainability networks would further the tourism industry as an active partner in national environmental strategies, thereby accelerating meaningful and measurable outcomes.

Table 4 A summary of implications for policy and industry

Gap	Strategic response	Likely impact
High coherence + moderate salience (Thailand)	<ul style="list-style-type: none"> Establish a single digital dashboard aligning roadmap milestones with Toolkit indicators. Mandate annual waste-flow reporting for all 4- & 5-star properties. 	Converts legislative ambition into measurable performance; reduces duplication.
Low coherence + high salience (Indonesia)	<ul style="list-style-type: none"> Consolidate municipal bans into national EPR law; link existing civil society datasets to official monitoring. 	Channels public momentum into enforceable standards; stabilizes indicator definitions.
Single-lever regimes (Brunei, Cambodia)	<ul style="list-style-type: none"> Move beyond bans toward multi-pillar strategies (taxes, deposit return, data disclosure). 	Elevates indicator awareness; speeds convergence with Toolkit benchmarks.

In summary, the nuanced insights presented here provide clear guidance for different policies and industry actors across ASEAN, emphasizing that robust governance structures must be supported by rigorous implementation, transparent monitoring mechanisms, and meaningful stakeholder collaboration to drive significant improvements in tourism sector sustainability.

5.5 Limitations

Sample size ($n = 4$). Effect sizes, not p-values, drive inference; broader generalization awaits more Toolkit responses.

Perception vs. performance. Importance scores capture salience, not real-world waste reduction; future work should match PFI against hard performance metrics (e.g., kg plastic/guest-night).

PFI subjectivity. Although double-reviewed, the three-level scale inevitably simplifies the nuanced legal context documented in Plastic Atlas.

5.6 Further Research

Expand the panel. Encourage remaining AMS to complete the Toolkit; integrate West-Pacific comparators (e.g., Fiji) to test regional generalizability.

Couple perception with outcomes. Merge hotel waste audits, DMCR coastal debris-tonnage datasets, and Toolkit salience scores to evaluate policy–performance elasticity. Trace causal pathways. Qualitative case studies of enforcement agencies and industry associations could unpack how integrated laws translate (or fail to translate) into indicator salience.

In sum, the analysis confirms that integrated laws tend to raise the strategic profile of waste indicators but also expose a crucial implementation gap: policy coherence is necessary but not sufficient. Thailand's tourism sector, in particular, will need improved data systems and stronger compliance incentives if its legislative ambition is to convert into measurable, plastic-free outcomes.

6. Conclusion

This study examined the relationship between the coherence of national plastic policy frameworks and the perceived importance of environmental sustainability indicators in ASEAN tourism, as reflected in the ASEAN Sustainable Tourism Measurement Toolkit. The findings indicate a broadly positive yet imperfect correlation: countries with more integrated plastic management strategies generally attach higher strategic importance to key environmental indicators, particularly solid-waste flows and greenhouse gas emissions. However, notable exceptions remain. In Thailand's case, it underscores that policy ambition, articulated through comprehensive roadmaps and legislative

instruments, requires robust enforcement mechanisms, coordinated institutional responsibilities, and effective data-reporting systems to translate into meaningful improvements in environmental sustainability metrics. Conversely, Indonesia's experience suggests that active civil-society engagement, private-sector ESG commitments, and public awareness initiatives can partially compensate for weaker regulatory coherence, elevating indicator importance independently of governmental structure.

For ASEAN countries aiming to strengthen tourism sustainability, this analysis recommends prioritizing integrated policy frameworks coupled with clearly defined roles, responsibilities, and accountability structures. Enhancing data infrastructure, mandating industry-wide reporting standards, and leveraging civil society and market-based pressures can substantially improve environmental outcomes. Future research should explore more comprehensive, multi-country datasets, directly linking legislative coherence to measurable environmental performance metrics, thereby deepening the understanding of policy effectiveness in achieving genuine sustainability transitions in tourism.

Ultimately, while coherent legislation forms the foundation of effective sustainability practice, true progress demands systematic implementation, consistent monitoring, and collaborative stakeholder engagement to transform ambitious roadmaps into tangible environmental results.

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Dams, Disasters, and Earthquakes:

The Case of Myanmar and the Risks of Hydropower in Earthquake Zones

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Abstract

Hydropower projects in earthquake-prone regions across Asia have increased the risk of dam disasters, reservoir collapse, and huge floods. In a world of glaciers melting, extreme weather and bigger than expected earthquakes, it has never been more important for the dam-builders in seismic zones to heed the warnings of independent seismologists and geologists. In the Mekong region we have two dangerously active seismic regions - in Myanmar and Northern Laos, where there are plans to install a series of dams.

On March 28 this year a magnitude 7.9 earthquake struck Myanmar, the most powerful seismic event in the world since 2023 [ScienceDirect] It was a brutal reminder of both extreme weather and the glaring absence of disaster preparedness in the most earthquake-prone country in ASEAN. One month after the disaster, the Irrawaddy journal reported that the 7.9-magnitude quake had claimed over 3,770 lives.

Earthquake specialists advise people not to view one big earthquake as an isolated event, but rather to look at the Myanmar case, as part of a new pattern of extreme weather, dam failures and disasters. The probabilities of another earth-shaking event are exacerbated by large dam construction in the seismically-active region which includes the Mekong. "The Himalayas, is a hotbed of tectonic unrest, already experienced a 7.7 earthquake in Tibet in January 2025, a sharp reminder of the region's volatility." reported in Modern Diplomacy.

The Myanmar Lesson

In the wake of the Myanmar disaster, Marie Manrique, program coordinator for the IFRC (International Federation of the Red Cross in Geneva), shared a warning that the dams on the Irrawaddy River may have been damaged.

"This earthquake was a "wake-up call," declared leading Thai seismologist Dr. Punya Charusiri, with first-hand experience of monitoring earthquake-prone regions of both Myanmar and Laos. "The Sagaing Fault is more dangerous than we ever thought,".

But instead of heeding nature's warnings, Myanmar's junta chief and a Chinese hydropower company is pushing to revive the massive Myitsone Dam project - also located on the same Sagaing fault-line, only 100 kilometers away from the epicenter of Myanmar's March earthquake. A Myanmar - China joint committee continues to plan the revival of this controversial dam, which had been suspended by then-President Thein Sein in 2011, under pressure from a strong environment lobby and safety concerns. A massive dam built on the same Sagaing fault-line would be a nightmare scenario and a recipe for disaster in a war-torn country and a faltering military regime.

In recent years hydropower dams have suffered many several setbacks in to their much-vaunted claims to be a safe and reliable source of energy. After an earthquake in Tibet in January this year, the Chinese authorities detected problems including cracks, in five out of 14 hydropower dams in the region of the five, three dams were emptied. In Tingri, the epicenter of the earthquake the walls of one dam tilted prompting the evacuation of about 1,500 people from six villages downstream.

Some lessons to be drawn from Myanmar and Chinese earthquakes, also apply to the tectonic unrest and simmering earth-faults that afflict northern Laos, where a cascade of dams has been mapped out in a dangerously active seismic zone. The Lao PDR has unveiled a programme to build nine dams on the lower Mekong- two the Xayaburi and the Don Sahong dams have been completed. The Luang Prabang dam is currently under construction. This earthquake-prone region has suffered many earthquakes including a recent big one. An earthquake of magnitude 6.2 on the Richter scale, hit northern Laos and Thailand, close to the Xayaburi dam, occurred in 2019, but luckily the dam and other infrastructure escaped serious damage. But the legacy of this earthquake in the minds of many Laotian residents is that they might not be so lucky next time. Te Navuth, permanent Vice-Chairman of Cambodia National Mekong Committee (CNMC) had raised serious doubts about the safety of the Xayaburi and the Luang Prabang - both dams funded and developed by Thailand.

Will the Construction of a Mega-dam near Luang Prabang Increase the danger of the next big earthquake happening in northern Laos?

Many Lao people living in the celebrated UNESCO World Heritage city of Luang Prabang are opposed to the massive 1,440 MW dam, now being built only 25 km from the city and perilously close to an active earthquake fault - only 8.6 km away.

Many local people can remember a recent Lao dam disaster: the Xe Pian -Xe Namnoy dam, that collapsed under torrents and floods sweeping away their villages in 2018. No wonder they fear what may become of their historic former royal capital, formerly known as Lang Xan, the birthplace of their nation. UNESCO is convinced that no large hydropower project can safely co-exist with this World Heritage site, established by the 1995 international agreement signed between UNESCO and Lao government.

Many observers watching the downstream Mekong dam developments may attribute Chinese dam breakdowns to a lack of strong risk assessment, to counter an obsessively rapid expansion of hydropower. The main difference with the MRC process is wrapped up in their promotion of “sustainable hydropower” label, coupled with the oversight of the six-month consultation process for all new dam projects.

It is clear that the MRC’s role as an advisory body providing the 4- member states with scientific and technical reports, and facilitating stakeholder meetings, does at least provide a modicum of public scrutiny, compared to the upper Mekong dams in China. But their narrowly defined technical consultation process is also flawed by a censoring any **debate on two crucial points**:

- 1) whether the dam meets criteria of sustainability?
- 2) whether mitigation can ever be effective or not?

Such a shallow facade of consultation trapped within a non-regulatory framework, does little to inspire confidence in the MRC’s will or capacity, to bring about good governance of Southeast Asia’s most important international river.

The Failure of the Luang Prabang Consultation

Their first technical review of the LPHPP (Luang Prabang dam project) in 2020 recognized that “The LPHPP was classified as an “Extreme Risk” dam according to LEPTS (Lao Electric Power Technical Standards (2018), and therefore required higher dam safety standards. This was communicated to the developer.” But some independent experts doubt whether the Mekong River Commission and the dam developers have adopted the “highest standards” they profess, in dealing with the threat stemming from large dams located in seismically active locations. According to dam risk expert Assistant Professor Pavisorn Chuenchum, deputy head of Water Resources and Engineering Chulalongkorn University, “A robust dam safety assessment in earthquake-prone areas should combine both engineering modelling, and detailed geophysical and seismological field work.” Revising the project design in accordance with engineering modelling for dam earthquake resilience is only one part of all-round risk surveillance. Detailed inspection and investigation of the active fault only 8.6 kms from the dam site, requires the participation of earthquake experts. However, the MRC’s routine technical operations relied on engineering experts with their focus mostly limited to modelling the capacity of dam walls to test for earthquake resistance.

Dr. Cheunchum, who teaches at the Center of Excellence in Disaster and Risk Management Information Systems (DRMIS) explained that testing for dam resilience is not enough. “Seismologists, geologists, and disaster risk experts provide essential checks and balances. A governance structure where geo-scientists have greater influence in decision-making, particularly in seismic-prone regions, would better protect public safety.”

Dr Punya Charusiri, an associate professor at Chulalongkorn University, is one of very few independent experts who is familiar with northern Lao's seismology. "I have visited Luang Prabang's active earthquake fault site three times," He told the author, "It is only 8.6 km from the dam-site. It is a dangerous project in the absence of an earthquake field investigation." The author requested MRC to respond to these criticisms but they replied, "our hydropower experts are all away on a mission."

UNESCO is extremely concerned that one of the most amazing world heritage sites in Asia, is under threat from this mega-dam construction, without any HIA (Heritage Impact Assessment) having been conducted prior to the dam being launched. This prompted UNESCO to dispatch a Luang Prabang monitoring mission in 2022, that urged Laos to suspend or stop all construction.

Both the Lao government and the MRC shunned the U.N. body's report. UNESCO's WHC (World Heritage Centre) has subsequently moved towards listing Luang Prabang as critically endangered world heritage site. However, the MRC did provide some explanations about why they did not engage with the UNESCO and their investigation of threats to the UN-designated world heritage site. The MRC secretariat told the author that the UNESCO agreement with the Lao government was a bi-lateral affair and outside their mandate.

MRC – a Step Forward

The MRC press officer did finally respond to my series of questions with the statement that "the MRC received information that "a dam safety review panel (DSRP) was established, and conducted two site visits (dam-site): one in September 2023, and another in October 2024. It comprises three international dam experts with advanced degrees specialising in dam safety, hydraulic engineering, and geotechnical engineering. "But the panel's expertise does not appear to include any detailed geophysical and seismological field work," cited by Dr Cheunchum as "essential checks and balances".

Dr. Saphan Singharajwaranpan, is another seismologist who has warned about the threats of earthquakes in northern Laos. The former Vice-President and Head of Geology at Chiang Mai University, before his retirement, told this writer, "if precautions and dam-safeguards are not in place and supervised by an international body of inspection, then there is a danger of a large earthquake. The dam wall might collapse, triggering "an inland Tsunami effect."

The confirmation that an international panel of inspection is now in place is a welcome step, but is it enough to quell all the doubts and fears that a dam mired in such deep controversy, should never have been launched in the first place?

Dr. Cheunchum also expressed concern that "the hydropower industry often funds or commissions engineering assessments, without independent oversight and strong regulatory frameworks, which are at risk of displaying bias, or down-playing the worst-case scenarios."

A prime example of downplaying was how the original classification of the Luang Prabang dam posed an “extreme risk?” was downgraded by a nexus of MRC engineers, and technocrats, in the course of their standard modelling exercise. The revised MRC technical review assessment diluted extreme risk into a “low seismic risk”. This was a critical judgment far more acceptable to MRC donors and western aid agencies, who may have otherwise expressed some alarm if the “extreme risk.” had not been diluted in the final assessment.

The role of Poyry (now renamed Afry), a Swedish-based corporation hired by the Lao government as their hydropower consultant, and supervisor of engineering and dam design for both the Xayaburi and the Luang Prabang has played a major role in MRC consultations in presenting key documents on behalf of the Thai dam developers and the Lao PDR, to the MRC for the technical review.

Afry repeatedly assured all parties, that the Luang Prabang dam was safe, and that they have adhered to the guidelines of ICOLD (International Commission on Dams) that “the dam would be designed to withstand extreme earthquakes. MRC experts are far more likely to be influenced by the engineering credentials of Afry, a global corporation, than to blow the whistle on even the worst-case scenario of a dangerous dam.

All examples of dams that have been suspended in the interests of public safety-the Myitsone dam in Myanmar, 13 dam projects on the upper Salween in Yunnan province, were invariably the achievements of environmentalists, geologists, and civil society. Cambodian government has also suspended two large mainstream dam projects as a result of independent assessments and environmentally- led investigations.

But in the light of the recent Myanmar 7.9 earthquake, which took people by surprise, perhaps the science of dam risk assessment is better served by the warnings of earthquake experts rather than engineers. In my interview, Dr. Charusiri observed, “They should not have launched the dam without first doing a serious earthquake field investigation.” He argued that “It is dangerous dam and I am sure it is not safe for residents of Luang Prabang to live there anymore.”

The UN’s world heritage site celebrates how biodiversity, culture and history are uniquely blended together in Luang Prabang. Former UNESCO Asia director Minya Yang lamented “The dam will become obsolete in a few decades or less, while centuries of Luang Prabang’s history and ecology, so important for future generations of Laotians and the world, would be damaged or lost forever.” Whatever man’s risk assessments, in the context of conservation of nature, humanity, ecotourism and public safety, does it make any sense to build a whopping great dam to desecrate this Lao paradise? And is it worth the increasing risk that Laos stands to lose its Luang Prabang’s already endangered world heritage status?

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