Regime Fragmentation in the Asia-Pacific Digital Trade Governance: Analyzing Regional and Bilateral Agreements Networks

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Abstract

The Asia-Pacific region is a global hub for digital trade, yet its governance landscape remains fragmented, shaped by diverse economic priorities and regulatory frameworks. In response, countries in the region have developed an intricate network of regional and bilateral agreements to regulate digital trade. These standards are sometimes set out in a dedicated chapter with digital trade rules of a comprehensive free trade agreement, like Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and Regional Comprehensive Economic Partnership (RCEP). In other cases, the Asia-Pacific countries have concluded specific agreements on digital trade, as in the case of the Digital Economy Partnership Agreement (DEPA), and many bilateral Digital Trade Agreements. This paper examines the fragmented regime of digital trade governance in the Asia-Pacific through an empirical analysis of regional and bilateral agreements network, utilizing social network analysis (SNA) to study the roles and positions of key players. Grounded in the regime complex theory, which emphasizes the overlapping and non-hierarchical nature of governing institutions, this study highlights how key countries' divergent approaches can be coordinated, and how to migitate this effect through digital trade agreements network.

Key words: Asia-Pacific, digital trade governance, regime fragmentation, regional and bilateral agreements, social network analysis

1. Introduction

The Asia-Pacific is witnessing the world's fastest growth in digital connectivity and internet access, making it a key player in the global digital economy. However, this growth comes with significant governance challenges, particularly the fragmentation of digital trade regulations. The diverse approaches of major players like China, the United States, and Singapore exemplify this fragmentation: China emphasizes data sovereignty and national security, the U.S. advocates for liberalized data flows, and Singapore promotes a balanced

strategy combining regulatory flexibility with interoperability. These divergent governance models create a complex regime landscape that poses challenges for seamless digital trade .Amid these complexities, digital trade agreements, both regional and bilateral, have emerged as crucial mechanisms for addressing governance fragmentation. Nevertheless, these agreements also create a "noodle bowl" of overlapping and sometimes conflicting standards.

In the contemporary discourse of international trade, particularly within the Asia-Pacific region, the regime complex of digital trade networks remain inadequately explored. This study endeavors to understand the Asia-Pacific digital trade and regime complex through regional and bilateral agreements. Specifically, this research will focus on these central questions:

(1) How can the diverse digital trade governance demands of countries in the Asia-Pacific region—such as China's focus on data sovereignty, the U.S. advocacy for free data flows, and Singapore's balanced approach—be coordinated to avoid creating conflicting, overlapping or inconsistent regulatory rules governing the digital economy?

(2) What roles and positions do key countries hold in the digital trade agreements network, and how can bilateral and regional agreements in the Asia-Pacific contribute to creating a unified framework to reduce the regime fragmentation?

2. Literature Review

This section examines the dynamics of digital trade cooperation in the Asia-Pacific, focusing on this region's governance diversity and regime fragmentation, their implications for MSMEs, and the role of trade agreements in mitigating these challenges, while identifying the research gaps that this study aims to address.

2.1. Regional and Bilateral Cooperation of Digital Trade in the Asia-Pacific

Although a large group of WTO members are actively having conversations on digital trade under the JSI, a far-reaching multilateral agreement on e-commerce appears to be unlikely. Therefore, regional and preferential agreements remain the main channel for the formulation of digital trade rules. Regarding regional differences, East and South-East Asia countries are prominent in incorporating Digital Trade Policies (DTPs) in their trade agreements, while Central Asia and South Asia countries lag. The more advanced Asia-Pacific economies,

especially Singapore, are taking the lead in signing Digital Economy Agreements (DEAs).[1] However, creating a new "noodle bowl" of inconsistent agreements — characterized by overlapping and conflicting regulations — should be avoided. The growing number of bilateral DEAs may make the digital trade environment unnecessarily complex. And the overlapping institutions and rules of the digital trade regime complex have increased competition between the US and Chinese data realms and increased the inefficiency of digital trade governance in the Asia-Pacific.

Agreements like RCEP and the AAEC adopt incremental approaches tailored to the region's economic and political diversity, prioritizing inclusivity by offering longer implementation periods and greater policy space for developing countries and LDCs, this flexibility has addressed some practical challenges such as inadequate digital infrastructure and regulatory capacity in less developed ASEAN nations.[2] In contrast, DEAs like DEPA and frameworks like CPTPP pursue more ambitious and liberalizing agendas, emphasizing advanced governance standards aligned with the interests of technologically advanced economies such as Singapore and New Zealand, thereby reflecting significant variations in participants' goals.[3] At the same time, overlapping institutions and rules in the digital trade regime complex amplify geopolitical competition, as exemplified by China's focus on data sovereignty under RCEP versus the U.S.'s liberalized data flow agenda in frameworks like the IPEF. These divergent approaches underscore the challenges of reducing governance fragmentation in the Asia-Pacific, where political preferences and economic priorities heavily shape digital trade agreements.[4]

2.2. Regime Fragmentation: Diverse Digital Governance Approaches by Key Players

The diversity of countries in Asia makes arriving at a cohesive outcome in any policy arena exceptionally challenging. It is not simply differences in size, wealth, and growth prospects that vary, but also the legal and institutional structures that can be wildly different across the region. Hence, any consistent policy outcome will need to take into account flexibilities in either rules or

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[1] Burri, Mira. "Towards a New Digital Trade Regime?" *Journal of International Economic Law 23*, no. 2 (2020): 451–473.
[2] Hsieh, Pasha L. "Incrementalism in ASEAN Digital Trade Agreements." *Asian Journal of International Law 10*, no. 3 (2020): 323–346.
[3] Duval, Yann, and Maria Semenova. "Multilateral and Regional Cooperation on Digital Trade Rules in Asia-Pacific." *ESCAP Working Paper* 227 (2023).
[4] Mishra, Neha. "Digital Trade and Inclusion in Asia-Pacific: A Case Study of CPTPP and DEPA." *Asia Pacific Law Review* 31, no. 2 (2023): 1–45.

implementation to account for variations in possible policy landscapes. The goal may not be to harmonize policies, but to better coordinate policy outcomes or to help achieve interoperability.

China's Emphasis on Data Sovereignty and National Security

China's approach to digital trade governance is grounded in principles of data sovereignty and national security. The nation enforces stringent data localization requirements, mandating that certain data, particularly personal and critical information, remain stored within its borders. China's policies reflect a robust regulatory approach aimed at safeguarding national interests and controlling data flows that could influence state security.[5] China views data as a national strategic asset, underlining the need to protect and control its flow to ensure state security.[6]

United States's Advocacy for Data Flow Liberalization and Minimal Regulation

The United States champions a digital trade model that encourages free cross-border data flows with minimal restrictions.[7] This approach supports a market-driven regulatory environment, with provisions designed to prevent forced localization and protect intellectual property.[8] The U.S. approach leans on industry self-regulation for privacy protection, fostering innovation by limiting government intervention in digital markets.[9]

Singapore's Balanced Approach Promoting Regional Integration

Singapore has emerged as a key player in digital trade governance, advocating a balanced approach that prioritizes regulatory coherence, interoperability, and international cooperation. Unlike the U.S. and China, Singapore champions frameworks that encourage cross-border data flows while ensuring adequate protection for digital identities and data privacy.[10] Singapore's leadership in the Digital Economy Partnership Agreement (DEPA) exemplifies its commitment to creating a unified framework that balances data flow liberalization with security and privacy

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[5] Gao, Henry. "Digital or Trade? The Contrasting Approaches of China and US to Digital Trade." *Journal of International Economic Law* 21, no. 2 (2018): 297–321.

[6] Segal, Adam. *Chinese Cyber Diplomacy in a New Era of Uncertainty*. New York: Council on Foreign Relations, 2017.

[7] Meltzer, Joshua P. "The Importance of the Internet and Transatlantic Data Flows for U.S. and EU Trade and Investment." *Brookings Institution*, 2014.

[8] Chander, Anupam, and Uyen P. Le. "Breaking the Web: Data Localization vs. the Global Internet." *Emory Law Journal* 64, no. 5 (2015): 677–739.

[9] Swire, Peter, and DeBrae Kennedy-Mayo. *U.S. Private-Sector Privacy: Law and Practice for Information Privacy Professionals*. Portsmouth, NH: IAPP, 2018.

[10] Tan, Daniel. "Singapore's Personal Data Protection Act and Cross-Border Data Transfer Regulations." *Singapore Academy of Law Journal* 31 (2019): 113–134.

protections.[11] Singapore invests heavily in digital infrastructure, aiming to become a global digital hub through policy innovation and regulatory flexibility.[12]

China's focus on data sovereignty, the U.S.'s advocacy for open data flows, and Singapore's balanced approach reflect the diversity in digital governance approaches within the Asia-Pacific. This fragmented regulatory landscape presents challenges for businesses, especially MSMEs, seeking to navigate the varying compliance requirements across jurisdictions.[13]

2.3. The Role of Digital Trade Agreements Network

Bilateral and regional agreements like DEPA are essential in addressing digital governance fragmentation across the Asia-Pacific by creating standards that apply across countries. These agreements promote interoperability and mutual recognition, making compliance easier for MSMEs. For instance, DEPA includes frameworks for artificial intelligence and digital identities, helping member states align policies while adapting to emerging technologies. The fragmentation in digital governance across the Asia-Pacific underscores the importance of such agreements. DEPA and CPTPP are foundational steps toward regulatory harmonization, streamlining compliance, and fostering a more unified digital trade environment. By developing these frameworks, the Asia-Pacific countries can support MSMEs and promote inclusive growth across the region.[14]

These initiatives are particularly critical in a region where divergent approaches to data sovereignty, cybersecurity, and privacy protection create significant barriers to integration. Additionally, the digital trade agreements network supports capacity-building efforts and fosters trust among member states, particularly in areas like cross-border data flows, electronic payments, and AI governance. For instance, ASEAN's initiatives on interoperability and personal data protection demonstrate how regional agreements can lay the groundwork for cohesive governance without imposing stringent, binding commitments that might deter participation from less developed economies.[15]

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[11] Chong, Terence, and Xue Chen. "The Digital Economy Partnership Agreement: Innovative Rule-Making for the Digital Economy." *World Trade Review* 20, no. 4 (2021): 541–566.
[12] Low, Linda. "Singapore's Digital Strategy and the Global Digital Economy." *Journal of Asian Public Policy* 11, no. 1 (2018): 1–17.
[13] Ferracane, Martina F. "Data Protection, Data Flows and International Trade Law." *Journal of World Trade* 51, no. 1 (2017): 1–22.
[14] Evenett, Simon J., and Johannes F. *Emergent Digital Fragmentation: The Perils of Unilateralism*. CEPR Press, 2022.
[15] ASEAN Secretariat. *ASEAN Digital Integration Framework Action Plan 2019-2025*. Jakarta: ASEAN Secretariat, 2021.

2.4. Research Gaps and Contributions

Existing scholarship has made significant progress in analyzing the current state of digital trade cooperation in the Asia-Pacific, the qualitative differences among key players' governance models. However, two critical gaps persist. First, there is a lack of quantitative analysis on the roles and positions of key countries within the digital trade agreements network. Current studies overlook the structural relationships among bilateral and multilateral agreements and their influence on regional digital governance coordination. Second, while the challenges of regulatory fragmentation are well-documented, innovative strategies for harmonizing diverse governance models remain underexplored.

This research addresses key gaps by employing social network analysis (SNA) to quantitatively evaluate the roles and influence of key countries within the Asia-Pacific digital trade agreement network. By analyzing centrality and brokerage roles of actors like Singapore, Japan, and Australia, the study highlights their potential to bridge governance divides and mitigate fragmentation. A key innovation of this research lies in its detailed comparison of major regional digital trade agreements, uncovering differences in provisions and governance priorities. Also, the study proposes actionable strategies, including harnessing brokerage roles, fostering modular agreements and supporting peripheral economies. These contributions offer a novel framework for addressing fragmentation, aligning governance models, and supporting MSME inclusion, advancing both academic understanding and policy development.

3. Theoretical Framwork and Methodology

Regime complex is defined as "an array of overlapping and nonhierarchical institutions governing a particular issue area"[16]. In the middle of highly institutionalized, fully integrated institutions and highly fragmented forms of institutions, there exists a wide array of regime forms that can be defned as "regime complex", which are characterized by identifable cores and loosely coupled systems of institutions (Alter and Meunier 2009[17]; Keohane and Victor 2011[18];

[16] Raustiala, Kal, and David G. Victor. "The Regime Complex for Plant Genetic Resources." *International Organization* 58, no. 2 (2004): 279–310.
[17] Alter, Karen J., and Sophie Meunier. "The Politics of International Regime Complexity." *Perspectives on Politics* 7, no. 1 (2009): 13–24.
[18] Keohane, Robert O., and David G. Victor. "The Regime Complex for Climate Change." *Perspectives on Politics* 9, no. 1 (2011): 7–23.

Nye 2014[19]). In circumstances where diferent actors have diferent or competing objectives, interests, or norms, fragmentation and conficts between individual regulatory arrangements are likely to emerge. To resolve the tensions, major actors may prefer a regime complex which allows more fexibility and adaptability in terms of mitigating diferent patterns of interests and norms (Alter and Raustiala 2018[20]).

While the concept of the regime complex has gained increasing traction in the study of Asia's regional integration or regionalism, the term has either been referred to implicitly (Camroux 2012[21]; Yeo 2018[22]) or has focused primarily on the study of Asia's regional security architecture (Buzan 2011[23]). There has been limited empirical research delving into the phenomenon of regime complexes in newly emerging felds of regional governance, such as digital trade governance in the Asia-Pacific. Only corning's (2022)[24] study attempts to examine the degree and nature of integration in the digital trade regime complex, explore how the complexity and fragmentation of digital trade governance shaped the digital trade strategies of AMS and how these strategies, in turn, shaped digital governance in the region. Gao and Chen's (2024)[25] research seek to understand the interplay between the regional regime complex and China's increasingly activism in the sphere of digital trade institutional building.

The Asia-Pacific digital trade regime complex refers to a set of overlapping formal and informal governance institutions that have emerged to regulate and manage digital trade within the region. These institutions, including intergovernmental agreements, regional organizations, and transnational initiatives, interact with each other and form a networked structure that produces systemic effects. A new trend in the study of international regime complex is the application of social network analysis (SNA). On one hand, the digital trade regime complex itself is a network composed of various institutions connected through shared membership,

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[19] Nye, Joseph S. "The Regime Complex for Managing Global Cyber Activities." *Global Commission on Internet Governance* (2014).
[20] Alter, Karen J., and Kal Raustiala. "The Rise of International Regime Complexity." *Annual Review of Law and Social Science* 14, no. 1 (2018): 329–349.
[21] Camroux, David. "Regionalism in Asia as Disguised Multilateralism: A Critical Analysis of the East Asia Summit and the Trans-Pacific Partnership." *The International Spectator* 47, no. 1 (2012): 97–115.
[22] Yeo, Andrew I. "Overlapping Regionalism in East Asia: Determinants and Potential Effects." *International Relations of the Asia-Pacific* 18, no. 2 (2018): 161–191.
[23] Buzan, Barry. "The South Asian Security Complex in a Decentering World Order: Reconsidering Regions and Powers Ten Years On." *International Studies* 48, no. 1 (2011): 1–19.
[24] Corning, Gregory P. "ASEAN and the Regime Complex for Digital Trade in the Asia-Pacific." *Journal of World Trade* 56, no. 6 (2022): 915–938.
[25] Gao, Xuechen, and Xiaoping Chen. "The Regime Complex for Digital Trade in Asia and China's Engagement." *Asia Europe Journal* (2024).

partnerships, or other forms of interaction. On the other hand, social network analysis (SNA) is particularly well-suited to capture, analyze, and model the complexity of these interactions, it helps to map the relationships between actors within the regime complex, enabling scholars to better understand how they interact and function collectively. This paper aims to use social network analysis (SNA) to study both regional and bilateral layers of digital trade agreements, providing valuable insights into how these agreements interact and shape digital governance.

4. Regime Fragmentation and Digitial Trade Agreements Network in the Asia-Pacific

4.1. Introduction and Comparison of Regional and Bilateral Digital Trade Agreements

The Asia-Pacific region has established itself as a leader in digital trade governance, driven by a diverse network of regional and bilateral agreements. Regional frameworks, as illustrated in Table 1, involve key players such as ASEAN countries, China, Japan, and Australia, aiming to harmonize digital trade rules across multiple economies. These agreements focus on creating broad standards for data governance, e-commerce, and cross-border digital flows while accommodating the region's diverse levels of economic and digital development.

Table 1: Regional Digital Trade Agreements

Title	Members	Scope	Type
Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)	Australia; Brunei Darussalam; Canada; Chile; Japan; Malaysia; Mexico; New Zealand; Peru; Singapore; Viet Nam; United Kingdom	Multilateral	FTA & EIA
Regional Comprehensive Economic Partnership (RCEP)	Australia; Brunei Darussalam; Cambodia; China; Indonesia; Japan; Republic of Korea; Lao People's Democratic Republic; Malaysia; Myanmar; New Zealand; Philippines; Singapore; Thailand; Viet Nam	Multilateral	FTA & EIA
United States-Mexico-Canada Agreement (USMCA)	United States, Canada, and Mexico	Multilateral	FTA
Digital Economy Partnership Agreement (DEPA)	Chile; New Zealand; Republic of Korea; Singapore	Multilateral	DEA
The ASEAN Agreement on Electronic Commerce (AAEC)	Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam	Multilateral	DTA

Data compiled by the author from the Asia-Pacific Trade and Investment Agreement Database (APTIAD)

In parallel, bilateral agreements, highlighted in Table 2, feature partnerships between technologically advanced economies like the United States, Singapore, and South Korea. These agreements emphasize tailored cooperation in areas such as interoperability, privacy standards, and regulatory alignment, enabling deeper integration between trading partners. Together, regional and bilateral agreements reflect a dual approach to digital trade governance, combining broad-based inclusivity with targeted, high-standard partnerships to address the region's fragmented regulatory landscape.

Table 2: Bilateral Digital Trade Agreements

Title	Members	Scope	Type
Australia-United States Digital Trade Agreement (AUS-DTA)	Australia; United States	Bilateral	DTA
Japan-United States of America Digital Trade Agreement (JUSDA)	Japan; United States	Bilateral	DTA
Republic of Korea-European Union Digital Trade Agreement (KOR-EU DTA)	Republic of Korea; European Union (EU)	Bilateral	DTA
Korea-Singapore Digital Partnership Agreement (KSDPA)	South Korea, United States	Bilateral	DTA
Australia-Singapore Digital Economy Agreement (ASDEA)	Australia; Singapore	Bilateral	DEA
Singapore-United Kingdom Digital Economy Agreement (SUK DEA)	Singapore; United Kingdom	Bilateral	DEA
Singapore-European Free Trade Association Digital Economy Agreement (SEFTA DEA)	Singapore; Iceland; Liechtenstein; Norway; Switzerland	Bilateral	DEA
Republic of Korea-Singapore Digital Partneship Agreement (KOSG DPA)	Republic of Korea; Singapore	Bilateral	DPA

Data compiled by the author from the Asia-Pacific Trade and Investment Agreement Database (APTIAD)

As shown in Table 3, the comparison of regional digital trade agreements in the Asia-Pacific highlights significant variations in their priorities and approaches. RCEP emphasizes broad policy coordination across its diverse membership, focusing on foundational trade facilitation measures but offering limited depth in digital trade provisions. While its soft

approach to issues like paperless trading and MSME support ensures inclusivity, it lacks the specificity needed to address advanced digital trade challenges. Similarly, CPTPP balances flexibility with trade liberalization goals but remains limited in areas such as private sector engagement and MSME provisions, reflecting its prioritization of broader trade frameworks over granular digital governance.

In contrast, DEPA and USMCA exemplify more comprehensive and structured approaches to digital trade governance. DEPA's modular framework emphasizes transparency, paperless trading, and MSME support, making it a pioneering model for digital governance interoperability. USMCA, on the other hand, stands out for its detailed rules on digital trade facilitation and its explicit encouragement of private sector innovation, underscoring its market-driven orientation. These agreements cater to technologically advanced economies, but USMCA's specificity may pose challenges for less developed members in terms of compliance and adaptation.

The AAEC, while narrower in scope, complements these agreements by emphasizing foundational principles like paperless trading and regulatory alignment, catering to the needs of ASEAN member states with diverse capacities. Despite these differences, the agreements collectively contribute to advancing digital trade in the region, with RCEP and AAEC offering foundational coordination and inclusivity, while CPTPP, DEPA, and USMCA push the boundaries of digital trade governance through their depth and specificity.

Table 3: Comparison of Regional Digital Trade Agreements

Topic	Description	RCEP	CPTPP	DEPA	USMCA	AAEC
E-commer/ Digital Trade	Include a principle of technological neutrality	NO	NO	NO	NO	YES
	Mention the applicability of WTO rules	Hard	NO	Hard	NO	NO
	Include provisions on transparency pertaining	Soft	NO	Hard	Soft	Hard
	Include provisions encouraging the private sector to adopt their own regulations	NO	NO	NO	Soft	NO
Digital Trade Facilitation	Include provisions that recognize the importance of facilitating digital trade	NO	NO	NO	Hard	Hard
	Include a provision on paperless trading	Soft	Soft	Hard	Soft	Hard
	Contain a provision on customs procedures automatisation or custom data exchange systems	NO	Soft	Soft	Hard	NO

MSMEs	Include provisions for the facilitation of e-commerce/digital trade SMEs or MSMEs	Soft	NO	Soft	Soft	NO
Cooperation on E-commer/ Digital Trade	Include an understanding orstand-alone provisions on cooperation	Soft	Hard	NO	Soft	Hard
	Include provisions on the participation of the Parties in international fora to promote that	Soft	NO	NO	Soft	NO
	Consider specific institutional arrangements for e-commerce/digital trade	Hard	NO	NO	Soft	Hard
Size of the Chapter	Number of articles on e-commerce/digital trade	17	18	65	65	19
	Number of words on e-commerce/digital trade	2896	2706	10887	3206	2522

Data compiled by the author based on the Trade Agreement Provisions on Electronic-Commerce and Data (TAPED) database

4.2. Digital Trade Agreement Network and Key Players' Roles and Positions

To analyze the structure of the Asia-Pacific digital trade agreement network, global measures were calculated to assess connectivity, clustering, and centralization, providing insights into its overall digital governance dynamics. As shown in Table 4, the network consists of 19 nodes (countries) and 134 edges (agreements), the density of 0.7836 indicates that a significant proportion of potential connections are realized, highlighting high connectivity but also potential redundancies that contribute to the fragmented nature of the governance framework. The transitivity of 0.8832 underscores a strong tendency for countries to form tightly-knit groups through multilateral agreements, reflecting regional cohesion but also reinforcing silos among distinct clusters. The eigenvector centralization of 0.1799972 suggests a moderately distributed influence, with no single country dominating the network. This is further evidenced by the E-I Index of -0.119403, which suggests a preference for intra-regional agreements over inter-regional ones, complicating efforts to integrate the network into broader global frameworks. These features collectively highlight the need for better alignment and harmonization to address overlapping and conflicting regulatory standards.

Table 4: Global Measures Results

Measure	Value
Size	134
Order	19
Diameter	2

Average Distance	1.59
Density	0.7836257
Average Degree	43.57895
Compactness	0.7046784
Clustering Coefficient (transitivity)	0.8832
Centralization (eigenvector)	0.1799972
E-I Index	-0.119403

To analyze the roles and positions of key countries in the Asia-Pacific digital trade agreement network, this study employs social network analysis. Subgroup analysis identifies two main clusters: the China group and the U.S. group, visually represented in Figure 1 with distinct colors. Next, centrality measures — including degree centrality (connections a country has), eigenvector centrality (influence through connected neighbors), closeness centrality (proximity to others in the network), betweenness centrality (facilitation of communication between nodes), and reach (a country's influence over network expansion) — were calculated to assess each country's position in the Asia-Pacific's digital trade governance, with results shown in Table 5. Node sizes in the network graph were scaled by eigenvector centrality in Figure 1. Lastly, brokerage analysis examined the functional roles of key players, with roles categorized as Coordinator (aligns subgroup interests), Consultant (advises without direct involvement), Representative (advocates subgroup interests externally), Gatekeeper (controls access between subgroups), and Liaison (connects unrelated actors). Results in Table 6 highlight Japan and Australia as the top brokers, marked in deep blue for their critical intermediary functions.

The social network analysis reveals significant disparities in the roles and influence of different countries within the digital trade agreement network. Singapore emerges as the central hub, with the highest eigenvector centrality, reflecting its strategic importance in connecting various actors across the region. Its balanced approach to digital governance—combining regulatory flexibility and strong commitments to privacy and interoperability—positions it as a natural bridge between divergent governance models. As a member of both multilateral frameworks (e.g., CPTPP and DEPA) and bilateral agreements, Singapore has the potential to mediate and align competing frameworks.

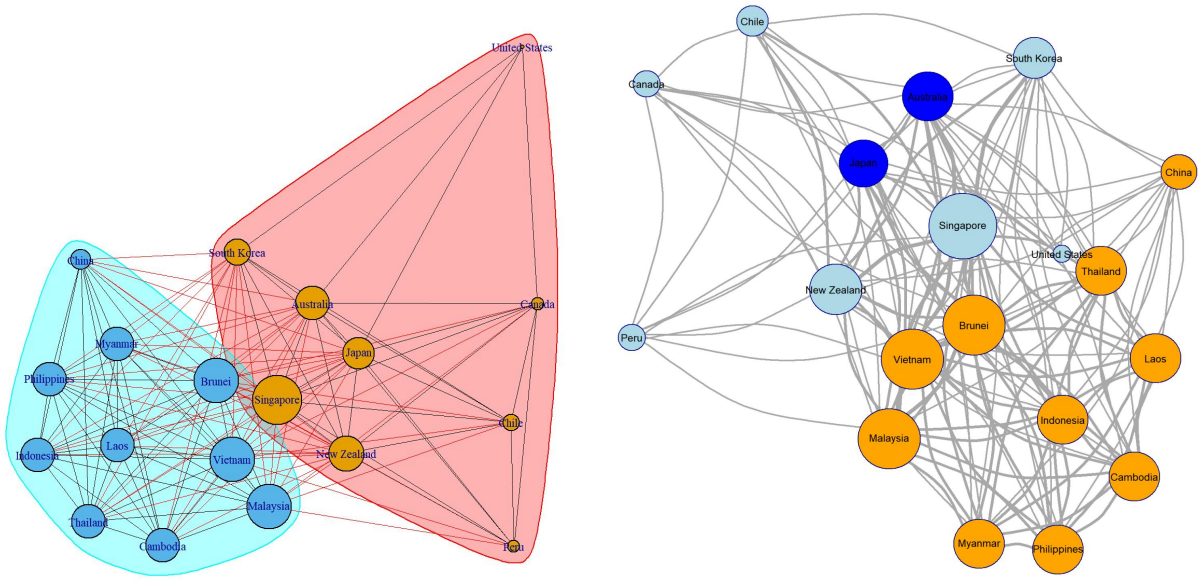


Figure 1: The Network of Digital Governance Regime Complex in the Asia-Pacific

The social network analysis reveals significant disparities in the roles and influence of different countries within the digital trade agreement network. Singapore emerges as the central hub, with the highest eigenvector centrality, reflecting its strategic importance in connecting various actors across the region. Its balanced approach to digital governance—combining regulatory flexibility and strong commitments to privacy and interoperability—positions it as a natural bridge between divergent governance models. As a member of both multilateral frameworks (e.g., CPTPP and DEPA) and bilateral agreements, Singapore has the potential to mediate and align competing frameworks.

China, with the highest betweenness centrality (17.16859) and closeness centrality (0.04545), plays a pivotal role in facilitating information flow and connecting otherwise disconnected parts of the network. Its central position allows it to influence regional digital trade policies, particularly in frameworks like RCEP, where it engages with less connected actors such as Laos and Myanmar. However, China's sovereignty-focused governance model and data localization policies present challenges for broader alignment with open digital trade frameworks. These policy preferences emphasize control over data flows, creating potential points of contention with frameworks that prioritize liberalization and cross-border data exchange.

Australia and Japan, with the highest brokerage scores (74 each), act as critical intermediaries, bridging the U.S.-aligned and China-aligned subgroups. As Coordinators, they align subgroup interests, fostering internal cohesion; as Gatekeepers, they facilitate cross-cluster communication, enabling dialogue and cooperation; and as Representatives, they advocate for their respective clusters in broader governance discussions. Their active participation in multilateral agreements, combined with strong bilateral ties, underscores their ability to mediate competing governance models, such as the U.S.'s market-driven approach and China's sovereignty-centered framework. This mediation capacity is crucial for reducing fragmentation and ensuring that regional digital trade governance evolves in a cohesive and inclusive manner.

In contrast, ASEAN's less developed economies remain peripheral players, exhibiting low centrality and limited influence in the network. While included in frameworks like RCEP and AAEC, these countries face challenges in fully participating in the evolving digital economy due to inadequate digital infrastructure and regulatory capacity. Their reliance on larger economies such as China and ASEAN's collective mechanisms highlights the need for targeted capacity-building initiatives to enhance their participation. Meanwhile, the United States has limited involvement in the Asia-Pacific's digital trade agreements. Its withdrawal from CPTPP and its preference for bilateral agreements rather than multilateral frameworks have relegated it to a more peripheral role in the region's digital trade governance. This absence creates a vacuum in leadership for advancing open digital trade principles, further emphasizing the importance of regional actors like Japan, Australia, and Singapore.

Table 5: Centrality Measures Results

	Degree	Eigenvector	Closeness	Betweenness	Reach
Singapore	17	1.00000	0.03030	0.28571	1
Malaysia	17	0.89999	0.03226	0.76190	1
Brunei	17	0.89999	0.03226	0.76190	1
Vietnam	17	0.89999	0.03226	0.76190	1
New Zealand	17	0.71294	0.03704	6.78571	1
Cambodia	14	0.68974	0.03226	0.40192	1
Indonesia	14	0.68974	0.03226	0.40192	1
Laos	14	0.68974	0.03226	0.40192	1
Myanmar	14	0.68974	0.03226	0.40192	1
Philippines	14	0.68974	0.03226	0.40192	1
Thailand	14	0.68974	0.03226	0.40192	1
Australia	18	0.68374	0.04167	12.17857	1

Japan	18	0.64680	0.04167	12.17857	1
South Korea	16	0.53585	0.04545	16.42692	1
China	14	0.41554	0.04545	17.16859	1
Chile	10	0.33909	0.03571	1.98645	1
Canada	10	0.25608	0.03846	9.29359	1
Peru	9	0.25283	0.03704	5.21026	1
United States	4	0.08466	0.03125	0.21978	1

Table 6: **Brokerage Analysis Results**

	Coordinator	**Consultant**	**Representative**	**Gatekeeper**	**Liaison**	**Total**
Australia	12	0	31	31	0	74
Japan	12	0	31	31	0	74
Brunei	0	4	21	21	0	46
Malaysia	0	4	21	21	0	46
New Zealand	4	0	21	21	0	46
Singapore	4	0	21	21	0	46
Vietnam	0	4	21	21	0	46
South Korea	6	0	17	17	0	40
Canada	8	0	3	3	0	14
Chile	4	0	0	0	0	4
United States	2	0	0	0	0	2

4.3. Shortcomings of the Digital Trade Agreements Network in the Asia-Pacific

The digital trade agreements network in the Asia-Pacific, while extensive and dynamic, faces significant shortcomings rooted in its fragmented and overlapping structure. These issues undermine the efficiency and inclusiveness of the region's digital governance framework, posing challenges for businesses and policymakers alike.

Fragmentation and Regulatory Overlap

The network of digital trade agreements in the region, such as DEPA, RCEP, and CPTPP, reflects a patchwork of regulatory frameworks that lack harmonization. Each agreement emphasizes distinct objectives—for example, RCEP's inclusivity contrasts with DEPA's focus on advanced digital trade norms. This fragmented architecture results in overlapping regulations and compliance redundancies, creating significant challenges for businesses navigating multiple agreements. As highlighted by ESCAP, this "noodle bowl" effect increases transaction costs and undermines the efficiency of regional integration.

Geopolitical Rivalries and Divergent Priorities

Geopolitical rivalries between major powers, particularly the U.S. and China, exacerbate fragmentation. The strategic competition has led to the proliferation of competing digital trade frameworks, such as the U.S. led Indo-Pacific Economic Framework (IPEF) and China's Digital Silk Road initiative. These initiatives, while advancing digital trade norms, reflect conflicting priorities — data sovereignty for China versus free data flows advocated by the U.S. This divergence complicates the establishment of a unified governance regime and risks deepening the digital divide in the region.

Limited Interoperability and Standardization

The lack of mutual recognition agreements (MRAs) and standardized provisions for cross-border data flows, cybersecurity, and digital privacy further underscores the network's shortcomings. Current agreements allow broad carve-outs for national security, as seen in RCEP, weakening commitments to data localization and free flow of information. This lack of interoperability stymies seamless trade and integration, particularly as businesses face regulatory barriers across jurisdictions.

Asymmetrical Participation and Peripheral Economies

Although the network demonstrates high connectivity, as reflected in measures like transitivity and density, power within the network remains unevenly distributed. Countries like Singapore act as central hubs, driving governance innovation, while smaller economies are relegated to peripheral roles with limited influence. This asymmetry perpetuates existing inequalities and hinders the region's ability to adopt inclusive and equitable policies.

Insufficient Support for MSMEs

MSMEs, which constitute over 98% of businesses in the Asia-Pacific, face significant challenges in participating in digital trade. The fragmented regulatory landscape imposes high compliance costs, while the lack of tailored provisions in many agreements further marginalizes these smaller enterprises. For example, frameworks like RCEP prioritize broad coordination but fail to address the specific needs of MSMEs, such as simplified reporting requirements or phased compliance schedules.

5. Leveraging the Network to Harmonize Divergent Digital Governance Approaches

The Asia-Pacific's digital governance landscape is marked by significant fragmentation, lacking a strong central leadership to align competing governance models. Unlike its approach in

Europe, where multilateralism dominates, the United States has historically preferred bilateralism in Asia, reflecting its skepticism toward regional institutional reliability. This preference for bilateral agreements exacerbates fragmentation, creating parallel governance frameworks that lack coherence and coordination. In this environment, no single framework or actor has emerged to unify the region's digital trade governance, leaving a patchwork of overlapping agreements and competing priorities.

(1) Establishing Non-Binding Rules

Non-binding rules play a crucial role in addressing the complexities of digital governance, as data usage extends far beyond economic trade. Frameworks like the Digital Economy Partnership Agreement (DEPA) demonstrate the potential of non-binding, modular agreements to foster collaboration while accommodating diverse national policies. DEPA's 12 modules, covering areas such as digital identity, cross-border data flows, and AI ethics, allow participating countries to incrementally adopt provisions tailored to their regulatory priorities. This flexibility not only supports experimentation and rapid problem-solving but also bridges differing governance models, such as China's data localization policies and the U.S.'s focus on cross-border data flows. Other non-binding initiatives further enhance interoperability. For example, ASEAN's model contract clauses for cross-border data transfers aim to create efficient and adaptable mechanisms aligned with national privacy policies, while Japan's "Data Free Flow with Trust" (DFFT) concept, endorsed by the G20 and G7, promotes trust and transparency in data governance. Together, these initiatives illustrate how non-binding rules can drive alignment, foster trust, and provide a foundation for broader regional coherence in digital governance.

(2) Harnessing Brokerage Roles to Facilitate Regional Consensus

Japan and Australia play pivotal roles in bridging governance divides in the Asia-Pacific, leveraging their brokerage positions to foster regional consensus. Japan, in particular, has shifted from a bilateral mercantilist approach to a proactive regional strategy, exemplified by its leadership in multilateral frameworks like CPTPP. This strategic evolution, driven by pressures such as China's BRI and the U.S. withdrawal from the CPTPP, reflects Japan's commitment to advancing liberal norms like transparency, sustainability, and the rule of law. By balancing formal rules-based agreements with flexible bilateral engagements, Japan mediates between competing governance models and supports less developed economies through tailored

initiatives. Similarly, Australia's brokerage role can help align regional efforts through its active participation in multilateral agreements and its strong bilateral ties.

(3) Fostering Collaborative Leadership for Regional Coherence

The lack of strong leadership in the Asia-Pacific necessitates collaborative efforts among brokerage actors and regional institutions to drive alignment. The roles of China and Singapore are pivotal for ensuring long-term coherence in regional digital governance. China and Singapore hold critical roles in shaping long-term regional coherence. China's influence within frameworks like RCEP highlights its capacity to align policy priorities, while modular agreements like DEPA provide opportunities for incremental alignment with regional norms. Singapore, as the region's central hub, exemplifies how regulatory innovation and inclusivity can align divergent governance models. Its leadership in promoting interoperability and privacy standards, coupled with its neutral geopolitical stance, positions it as a mediator capable of bridging divergent governance models and driving regional coordination.

(4) Incorporating Peripheral Economies into Regional Governance

The effective integration of peripheral economies, such as some ASEAN member countries, is essential to ensure equitable participation and reduce asymmetries in digital trade governance. Establishing a Regional Digital Innovation Fund could play a key role in providing capacity-building resources to address disparities in infrastructure, regulatory frameworks, and institutional capacity. This fund would support initiatives like upgrading digital infrastructure, technical training, and regulatory alignment, enabling less developed economies to better integrate into regional frameworks. Central actors like Japan and Singapore could lead these efforts, leveraging multilateral funding mechanisms to harmonize legal standards and increase inclusivity. Strengthening the capacity of peripheral economies not only promotes fairness but also enhances the resilience and effectiveness of regional digital governance.

(5) Proposing a "Digital Governance Stability Board"

To address the fragmentation of digital governance, a practical solution is to establish a "Digital Governance Stability Board" modeled after the Financial Stability Board (FSB). This board would create a global network of policymakers, regulators, and experts who convene to share information, exchange best practices, negotiate principles and standards, and coordinate national approaches. Inspired by the FSB's success in harmonizing financial regulations after the

2008 financial crisis, this institution could align diverse digital governance priorities while respecting national sovereignty.

In the Asia-Pacific, this board could leverage existing platforms like APEC and ASEAN to ensure regional representation and foster interoperability. By addressing critical issues such as data privacy, cybersecurity, and cross-border data flows, it could reduce governance fragmentation and establish shared benchmarks. Additionally, it could build on flexible modular agreements like DEPA and CPTPP, incorporating principles of incremental alignment to accommodate varying policy priorities. Priorities such as capacity-building for less developed economies, harmonizing Mutual Recognition Agreements (MRAs), and supporting MSMEs through tailored compliance pathways would ensure equitable participation. Ultimately, a Digital Governance Stability Board could serve as both a regional and global model, fostering collaboration, trust, and resilience in the digital economy, positioning the Asia-Pacific as a leader in shaping global digital governance norms.

(6) Mitigating the Impact of Regime Fragmentation on MSMEs in the Asia-Pacific

The fragmented digital governance landscape in the Asia-Pacific imposes disproportionate burdens on MSMEs, which account for over 98% of businesses in the region and are vital to economic growth and employment. Divergent regulations on data privacy, payment systems, and taxation hinder their participation in digital trade. Digital trade agreements such as DEPA and CPTPP play a critical role in reducing regulatory fragmentation by offering tailored provisions that ease compliance for MSMEs. DEPA's modular framework allows incremental adoption of digital trade standards, accommodating diverse national priorities while lowering barriers for smaller firms. Similarly, CPTPP emphasizes transparency and standardization, providing a foundation for mutual recognition that simplifies cross-border operations for MSMEs. To further support MSMEs, agreements can include MSME-Specific Compliance Pathways that reduce administrative burdens, such as simplified reporting requirements and phased implementation schedules. Real-time support through Digital Service Networks enables MSMEs to navigate the complexities of cross-border trade, enhancing their participation in the digital economy.

Interoperability in the Asia-Pacific can be enhanced through flexible enforcement mechanisms and Mutual Recognition Agreements (MRAs). Flexible mechanisms, such as phased implementation schedules and compliance pathways, can accommodate the diverse capacities of economies, allowing gradual adoption of standards. Frameworks like DEPA and MRAs are

critical in alleviating these MSMEs' burdens by simplifying regulatory requirements and fostering a consistent digital trade environment[26]. For example, MRAs can align standards across agreements by harmonizing CPTPP's e-commerce provisions with AAEC's emphasis on technological neutrality, creating shared benchmarks for data security and interoperability that benefit MSMEs operating across multiple jurisdictions.

6. Conclusion

The Asia-Pacific region's digital trade landscape exemplifies both the promise and challenges of an interconnected yet fragmented governance framework. This paper has explored the intricate web of bilateral and regional digital trade agreements, uncovering the systemic impacts of their overlapping structures on governance coherence and regional collaboration. Leveraging the analytical lens of regime complex theory and the methodological rigor of social network analysis (SNA), the study has illuminated the central and brokerage roles of key actors, such as Singapore, Japan, and Australia, in mediating between competing governance models.

In light of these challenges, plurilateral agreements offer a pragmatic solution. As highlighted by the IMF, such agreements help rebuild trust and mitigate fragmentation (IMF, 2023)[27]. These flexible and non-discriminatory frameworks provide a foundation for interoperability, reducing compliance burdens and enabling gradual harmonization. In addressing the gaps in existing scholarship, this paper advances both academic discourse and practical policy solutions. The findings advocate for the role of modular frameworks, regional platform, key brokerages, collaborative leadership to address the regime fragmentation, also aim to incorporate peripheral economies, propose a "Digital Governance Stability Board" and mitigate the impact of regime fragmentation on MSMEs in the Asia-Pacific.

Future research should delve deeper into the specific impacts of governance fragmentation on MSMEs. As highlighted in this study, MSMEs face unique challenges due to limited resources and the complexity of adapting to diverse regulatory environments. Investigating how digital trade agreements can better support MSMEs—through tailored compliance pathways,

[26] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). *Digital Trade Regulatory Review for Asia-Pacific*. Bangkok: United Nations, 2023. https://www.unescap.org.
[27]International Monetary Fund. *Geo-Economic Fragmentation and the Future of Multilateralism*. IMF Discussion Note. Washington, DC: International Monetary Fund, 2023. https://www.imf.org.

digital service networks, and enhanced interoperability mechanisms—offers a promising avenue for advancing both academic and policy discourse.

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