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Rule-Makers, Rule-Takers, and Domestic Regulatory Space: Emerging Trends in AI Governance through Free Trade Agreements

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Abstract

This article analyses how artificial intelligence (AI) relevant provisions in free trade agreements (FTAs) are emerging as instruments of regulatory governance. Using trade-related databases, namely DESTA and TAPED, we examine 16 agreements involving 50 countries that contain AI-relevant rules across five domains: data privacy, cross-border data flows, open government, data sovereignty/location of computing, and domestic data infrastructure. By adapting a structure-location-commitment framework, we develop an Agreement AI Index (AAI Index) to measure the breadth and depth of these provisions over time and across countries. The findings show that coverage converges faster than legal depth. Further, provisions relating to cross-border data flows and anti-localisation are much more and often binding, unlike open government data and domestic infrastructure provisions that are weak and scattered. Results show cross-country variation in the design of such provisions. Some countries ensure inclusion through hard obligations, while others refer to

such provisions through softer clauses. As a result, a small group of countries are 'rule-makers' and are leading the way with standard templates, unlike most countries that act as "rule-takers". We link these patterns to debates on AI-related legalisation, deep integration, and club governance to contribute to the literature on regulation and governance under FTAs.

Keywords: AI, data, preferential trade agreements, rule-makers, rule-takers

1. Introduction

Debates on artificial intelligence (AI) governance have mainly focussed on domestic regulation, soft-law principles, and emerging regional instruments (Zaidan et al, 2024; Roberts, et al, 2023; Hulok, 2025). The advancement of technology, in particular AI, has led to the inclusion of digital trade provisions in trade (Sisto and Van der Marel, 2025; Jones, 2023; Rahman and Rahman, 2022; Ferencz, et al. 2022) and, as a result, an important part of the regulatory architecture is now being assembled through trade agreements (Burri, 2025; 2017; Leblond, 2024; Aaronson, 2018). The latest generation of trade agreements include digital trade and AI-related provisions (OECD, 2022; OECD, 2025; Li, 2025; WTO, 2025; UN ESCAP, 2025). Recent studies highlight the increasing number of trade agreements with digital economy provisions and that specific digital agreements address AI-related issues with explicit AI provisions (WTO, 2025; Li, 2025; Chen & Gao, 2022). For instance, the OECD (2025) recognises that the new digital trade arrangements include specific AI-related provisions and stresses the importance of developing ethical governance frameworks. Viewed through the lens of regulation and governance, the incorporation of AI provisions into trade agreements has transformed these into key instruments for structuring domestic regulatory space and across levels of governance (Burri, 2025; Fernandes et al., 2021; Aaronson and Leblond, 2018; Burri, 2017). Even though new trade agreements are rapidly embedding AI-relevant governance choices within trade-related legal instruments, the inclusion of AI-relevant rules in the international trade architecture lacks systematic evidence on their evolution, depth, and cross-country patterns – this is an area our paper develops.

In the thirty years since the World Trade Organisation (WTO) was established, the number of trade agreements in force has increased from 45 to the current total of 375 (WTO, 2025)[1]. The initial focus of trade agreements was on tariff reductions (Ruta, 2017). Nevertheless, the early trade agreements also allowed countries that signed them to circumvent their responsibilities through non-tariff measures (Baldwin, 2011). The next wave of trade agreements aimed to harmonise regulations principally concerning quotas, rules of origin, technological barriers to trade (TBT), and sanitary and

phytosanitary (SPS) standards (Freund and Ornelas, 2010). Subsequent agreements began to encompass services liberalisation, investor protection, intellectual property rights, competition policy, and government procurement (Baccini et al., 2011). Building on these early waves of tariff reduction and basic regulatory disciplines, later agreements are deeper and extend to the environment, labour, and intellectual property, as well as dispute resolution mechanisms. This has led to preferential trade agreements becoming a mechanism for behind-the-border regulatory governance (Ruta, 2016). With the expansion of trade agreements, the number of countries participating in them has grown significantly, and many countries are simultaneously parties to multiple, often overlapping, trade agreements, creating a dense, interwoven web of commitments (Freund and Ornelas, 2010). Further, as trade agreements have grown in popularity countries have incorporated broader areas, including the so-called "WTO-plus" and "WTO-extra" provisions (Horn et al, 2010; Baldwin, 2011; Khorana and Garcia, 2013) and have broadened the agreements in scope to encompass a broader range of policy areas and regulatory depth (Hofmann et al., 2017; Baldwin, 2011). In terms of work on modes of data regulation, Wong et al. (2025) highlight that individual contracting, public law, and private standards along five dimensions of data pose problems for regulation.

This paper examines the dimension of the expanding AI coverage, namely, the provisions relating to AI, and traces the evolution of provisions over time and across agreements. It conceptualises AI-related provisions as instruments of regulatory governance embedded in trade treaties and analyses the design of trade agreements using a structure-location-commitment framework. We assess how AI provisions have evolved over time within trade agreements, show how patterns differ across regulatory domains, namely data privacy, cross-border data flows, open government, data sovereignty/location of computing, and domestic data infrastructure. Finally, how national trends in AI-relevant commitments diverge, and in cases of divergence, do countries with higher-level commitments act as rule-makers, unlike others that remain rule-takers in AI-related trade governance? By examining how AI has been incorporated into trade agreements, we can gain insights into how governments anticipate, regulate, and respond to emerging technologies within the bilateral and regional trading system. This analysis also sheds light on the likely trajectory of future trade agreements, helping us to better understand how AI transformation and frontier technologies will continue to reshape the architecture of global trade governance.

The structure of the paper is as follows: section 2 presents an overview of the emerging AI agenda in trade agreements. Section 3 presents the data, sample and methodology used. Section 4 discusses the main findings; Section 5 lists the theoretical

and practical implications of the analysis; Section 6 concludes with directions for future research.

2. AI Governance and Deep Trade Agreements

2.1 The Emerging AI Agenda in Trade Agreements

Given the growing emphasis on data, digital services, and e-commerce as core elements of 21st-century regionalism (Baldwin, 2011; Horn et al., 2010; Hofmann et al., 2017) an emerging AI agenda in trade agreements presents a part of a broader shift towards even deeper integration and digital trade governance. Currently, AI-relevant rules feature as an extension of digital trade chapters and related provisions governing data flows, standards, and regulatory cooperation (Rahman and Rahman, 2022; Burri, 2021). Since AI systems rely on large-scale data access, cross-border computing, and interoperable digital infrastructures, the rules that structure the data-driven economy must prefigure the trade governance of AI (Aaronson and Leblond, 2018; Khorana and Mahate, 2025). The legal literature highlights how obligations and the delegation of rules feature in trade agreements and include from soft cooperation clauses to hard, enforceable commitments (Abbott et al., 2000; Allee and Elsig, 2019; Baccini et al., 2015). In this context, AI-relevant provisions can be conceptualised as the latest development in deep integration commitments, which are embedded within the digital trade architecture of preferential trade agreements.

Some developed economies have used high-standard PTAs and digital economy agreements to promote their preferred data governance models, which have become the de facto benchmarks for others (Aaronson and Leblond, 2018; Burri, 2021). This could lead to regime complexity, characterised by overlapping and non-hierarchical institutions rather than a single comprehensive framework for digital governance (Raustiala and Victor, 2004; Keohane and Victor, 2011). In effect, AI provisions in trade agreements are fragmented, and a small group of rule-makers could produce templates that latecomers are likely to adopt (Khorana and Mahate, 2025; Lupu and Poast, 2020).

Against this backdrop, the five AI domains examined in this paper, namely data privacy, cross-border data flows, open government, data sovereignty/location of computing, and domestic data infrastructure, encapsulate the core trade-relevant dimensions of AI governance. Data privacy and cross-border data flows speak directly to the conditions under which personal and non-personal data can be collected, processed, and transferred across jurisdictions, which have the potential to shape competition for AI and digital service providers (Aaronson and Leblond, 2018; Mattoo and Meltzer, 2018). Open government provisions govern access to public-sector data as

an input into AI innovation and transparency, while data sovereignty and localisation disciplines determine whether computing facilities and data storage can be restricted to national territory, with direct implications for market entry, cloud services, and global value chains in AI (Burri, 2021; Lino, 2024). Finally, domestic data infrastructure provisions address enabling conditions such as digital identity, interoperability frameworks, and data innovation systems that underpin the ability of firms and governments to deploy AI at scale (Khorana and Mahate, 2025). Taken together, these domains map the interface between AI, data governance, and trade policy. Building on these, the next section examines how different strands of the literature have operationalised and measured provisions in PTAs.

2.2   *Measuring AI Provisions in Trade Agreements*

This section considers how provisions in preferential trade agreements are measured and adapts these tools to AI-relevant rules. Early work on SME chapters introduced the criteria of structure, location, and legal strength to capture the relative weight of provisions (Monteiro, 2016), unlike later studies which have gender and sustainability issues in agreements by developing minimum, high-standard, and non-mandatory clauses (Bahri, 2018; Monteiro, 2021; George and Yamaguchi, 2018; Duran and Morin, 2020). Building on these, we apply a structure - location - commitment lens to examine AI-related rules across five domains to develop an Agreement AI Index (AAI Index) that aggregates the breadth and depth of commitments.

A first strand of literature relevant to AI-related provisions concerns how PTAs structure commitments for SMEs. References can be made implicitly or explicitly through various typologies in different sections of the agreement, as well as their degree of enforcement, which developed three-point criteria, which included the structure, location, and type of commitment within the trade agreement (Monteiro, 2016). Each of these classifications was segregated to highlight its weight and importance. For instance, structure was segregated into five categories. At the lowest level is a footnote which tends to be buried within the text and thereby confined to the lowest levels of visibility, prominence, and interpretive significance, carrying minimal independent weight. The coverage and scrutiny increase as the provisions move from being contained in sub-articles to being included inside an article, to a specific article, and ultimately to placement within specific chapters. The latter reflects the highest level, as a whole chapter is devoted to the provisions and generally affords comprehensive coverage. Monteiro (2016) finds that provisions can be located within the main text, annex or a side agreement. This reflects provisions located in the main text carry the greatest visibility, prominence, and legal weight; those placed in annexes hold

intermediate significance as they qualify or elaborate on the core text; while provisions contained in side agreements are the least prominent, with reduced interpretive significance and comparatively lower overall weight. Third, Monteiro (2016) points out that in drafting, language that merely recognises an issue reflects the lowest level of weight, encouragement denotes a modest but non-binding push, recommendations carry greater persuasive authority without enforceability, and obligations embody the highest level of visibility, prominence, and legal significance by creating binding commitments. Together, these three criteria enable a comprehensive coverage framework for the provisions, yielding up to 60 possible combinations on the structure-location-commitment matrix to AI provisions.

A second strand of work, on gender-related provisions, reveals similar measurement challenges. There is complexity of gender-related provisions in trade agreements due to the absence of a clear definition and the lack of a single, consistent approach to determining what constitutes a 'gender-related' provision (Monteiro (2021). Nevertheless, using a similar methodology to Monteiro (2016), the study finds that gender provisions can be categorised into 13 main types of provisions related to gender and gender-related issues. Similar to the case of SMEs, the study found varying levels of visibility and legal weight across gender-related provisions, ranging from broad definitions and principles to specific binding commitments. Notably, the particular nature of gender issues also led some trade agreements to incorporate provisions granting spouses of temporary workers the right to short-term entry or an extension of stay (Monteiro, 2021). While much of the existing literature, such as Monteiro (2021), assesses gender-related provisions in trade agreements through quantitative frequency-based measures, Bahri (2018) adopts a diagnostic approach for self-evaluation maturity-based framework that shifts the focus from the mere presence of gender-related terms to the qualitative characteristics of the provisions,[2] demonstrating the shift from just focusing on the frequency to maturity and depth of commitments.

A third strand of scholarship examines sustainability provisions and distinguishes between minimum, high, and non-mandatory clauses. George and Yamaguchi (2018) employed a survey instrument distributed to over 300 experts, and one question examined the extent to which sustainability is incorporated into trade agreements. While such surveys provide valuable insights from experts, they are limited by low response rates, which in this case was only 22%, as well as by the inherently subjective nature of the responses. By contrast, IEEP (2022) adopts a more text-based approach, examining the extent to which provisions from Multilateral Environmental Agreements (MEAs) are incorporated into trade agreements. This study quantifies both the total number of MEAs explicitly referenced and identifies the most frequently cited agreements. More

recently, Duran (2023) has advanced literature by categorising sustainability provisions within trade agreements in relation to prevailing international regulatory standards.[3] This work demonstrates how PTAs differentiate between baseline and high-standard regulatory commitments - an insight that is central to our analysis of AI provisions.

The discussion illustrates how different categories of provisions in trade agreements have been measured and examined, ranging from frequency-based assessments to maturity frameworks and regulatory classifications. The discussion also highlights the diversity of methodological approaches available in the literature, which gives a theoretical basis for this study to develop its own analytical framework explicitly tailored to AI. Unlike gender or sustainability, where analysis benefits from established international instruments such as the Buenos Aires Declaration on Trade and Women's Economic Empowerment, signed by over 120 countries or Multilateral Environmental Agreements signed by over 190 countries. AI lacks any comparable global declaration or binding multilateral framework. At the same time, the analysis of AI-related provisions needs to account for various dimensions, including the development of AI infrastructure, readiness, and institutional capacity. Moreover, the concentrated nature of AI provision adoption, primarily driven by high-income economies, suggests the potential for greater standardisation through diffusion and convergence across agreements.

Drawing on the different strands, we argue that AI provisions require an analytical framework that captures both breadth (occurrence across domains) and depth (structure, location, commitment). Building on the insights, the study formulates the following exploratory research questions:

RQ1: How have AI provisions evolved over time within trade agreements, in terms of breadth and depth?

RQ2: How does the pattern of evolution differ across the five AI domains?

RQ3: How do national trends differ in the evolution of AI-relevant treaty commitments?

RQ4: To what extent do a subset of countries act as rule-makers, while others are rule-takers, in AI-related trade governance?

3. Methodology

3.1 Data and Sample

Our empirical analysis draws on two datasets to ensure a comprehensive coverage of preferential trade agreements (PTAs) and their digital- and data-related provisions. First, the Design of Trade Agreements (DESTA) database provides the total FTAs in force from 2009 onwards, which is when AI-relevant rules began evolving in a

systematic way (Dür et al., 2014). We retain only those agreements that contain AI-related provisions (as identified in Khorana and Mahate, 2025), which gives a sample of 16 agreements signed by 50 countries, or 24 when regional entities such as the European Union and ASEAN are treated as single parties. Second, we rely on the Trade Agreement Provisions on Electronic-commerce and Data (TAPED) dataset to cross-check and refine our coding of digital trade and data governance clauses. This ensures we capture both stand-alone e-commerce and digital trade chapters and AI-relevant provisions embedded in other chapters of the agreements (Burri and Schlaepfer, 2020). Thus, DESTA and TAPED allows situating AI-relevant clauses within the broader architecture of deep integration while maintaining a targeted focus on the agreements that regulate AI-related issues.

3.2   Coding and Scoring Procedure

We code AI-relevant provisions by using an adaptation of the structure-location-commitment matrix developed by Monteiro (2016, 2021) and applied in related work on SME, gender, and sustainability provisions (Bahri, 2018; Duran and Morin, 2020). For the structure dimension, we distinguish between agreements that contain dedicated chapters or sections on digital trade, e-commerce, or AI-related topics and those in which relevant rules appear only as scattered provisions within other chapters (e.g. services, intellectual property, or cooperation). For the location dimension, we record whether AI-relevant rules are placed in core market access or rules chapters, in cross-cutting horizontal provisions, or in non-core sections such as cooperation, annexes, or side instruments, on the assumption that more central placement signals greater legal and political salience. For the commitment dimension, we assess the language of each provision and classify it along a spectrum from purely hortatory formulations (e.g. "may", "encourage", "promote") to clearly binding obligations (e.g. "shall", "shall not", "must"), taking into account both positive duties and negative constraints on regulatory autonomy.

We employ a two-level, scoring-based assessment to measure the presence of AI provisions in trade agreements. The first level utilises the Monteiro (2016) matrix, which evaluates each presence through the lenses of structure, location, and commitment. We are not only conducting a frequency-based analysis but also seeking to assess the relative importance of each AI-related provision within the trade agreement by allocating points. In cases where multiple references are made, only the highest-level reference is considered for each of the six AI areas: data privacy, cross-border data flows, open government, data sovereignty, and domestic data infrastructure. A

combined score is then calculated for each trade agreement and type of AI provision, and subsequently for the trade agreements overall.

We used an equally weighted scoring mechanism applied to each AI provision. Each agreement is scored on a five-point scale (1–5) for structure, location, and commitment across the five AI domains, namely data privacy, cross-border data flows, open government, data sovereignty and location of computing, and domestic data infrastructure. We used an equally weighted scoring mechanism. A score of 1 indicates minimal and weakly worded reference, and 5 reflects multiple, detailed, and binding provisions embedded in chapters. We aggregate these scores across the three dimensions using equal weights to construct an AAI Index for each agreement and domain and sum across domains to obtain an overall AAI Index score. This procedure enables us to capture both the breadth (presence across domains) and depth (strength and centrality) of AI-relevant commitments and forms the basis for the intertemporal and cross-country analyses that follow. From a policy perspective, we envisage that a weight-based scoring criterion will encourage progressive change in both the adoption of AI provisions and make them prominent and obligatory within future trade agreements. The structure, location, and type of commitment classifications and scoring mechanism are illustrated in Table 1.

Table 1: Presence of AI Provisions and Scoring Criteria

Structure	Score	Location	Score	Commitment	Score
Footnote	1	Side agreement	1	Recognition/ Affirmation	1
General mention within the article	2	Annex	2	Encouragement	2
Sub-article	3	Interpretative note	3	Recommendation	3
Specific article	4	General mention in the main text	4	Strong commitment (e.g. "shall endeavour")	4
Specific chapter	5	Dedicated section in the main text	5	Obligation (hard law, enforceable) = 5	5

Source: Own compilation

4. Findings and Discussion

RQ1: How have AI provisions evolved for countries that have adopted them in trade agreements, and what is their current connotation (over time)?

A key aspect of AI-related provisions in trade agreements is that they vary significantly. The frequency with which AI provisions appear, as well as their structure, location, and level of commitment, differ considerably across trade agreements. This difference highlights how governments have distinct objectives, negotiation styles, and legal cultures when incorporating AI-related issues into trade agreements. Some agreements place AI provisions in the margins from a structural perspective, such as the Regional Comprehensive Economic Partnership (RCEP), which utilises footnotes in its e-commerce chapter to clarify the rules surrounding computing facilities and cross-border data transfers. In comparison, the US-Mexico-Canada Agreement (USMCA) includes AI provisions within specific articles and sub-articles, thereby marking a significant step forward in its structure. These contrasts underscore how different agreement templates embody diverse philosophies of AI regulation and provide an initial answer to RQ1 regarding the evolution of AI provisions over time.

It is not just the structure, but also the location of AI provisions, where we find considerable diversity among trade agreements. On the one extreme, we have side agreements that contain AI provisions, as in the case of the US–Japan Digital Trade Agreement. Interestingly, these provisions are not part of the trade agreement, but they nonetheless establish binding standards for data flow. In the RCEP, footnotes clarify how the AI provisions apply, whereas other trade agreements place AI provisions in annexes or provide interpretive remarks. AI provisions can also be generic mentions in the main text, such as the ASEAN Agreement on Electronic Commerce, which discusses facilitating AI provisions without providing detailed information on cross-border flows. The strongest examples of AI Provisions are the CPTPP and the EU-UK TCA, which include -dedicated sections within the main agreement, thereby demonstrating the importance of such commitments. This diversity in the structural placement and location of AI provisions is summarised in Table 2, Panels A and B.

The real strength of AI provisions lies in the obligations they establish between the parties, as illustrated by the commitment. The Digital Economy Partnership Agreement (DEPA) includes recognition clauses that acknowledge the importance of data transfers; however, these clauses do not create any legal obligations. The ASEAN E-Commerce Agreement employs encouraging language and encourages countries to cooperate in specific AI areas. The Australia–Singapore Digital Economy Agreement (SADEA) incorporates "shall endeavour" and other recommendations to show a stronger purpose,

although it is still not a binding law. This is very different to the USMCA and the CPTPP, which impose hard obligations, requiring parties to permit cross-border transfers subject to narrowly defined exceptions. When all these aspects are considered together, it becomes clear that AI provisions within trade agreements are far from uniform. This heterogeneity in the presence of AI provisions within trade agreements also supports our approach of moving beyond frequency-based measures towards examining the relative depth, enforceability, and policy weight of AI provisions. The diversity of AI provisions in trade agreements is illustrated in Table 2. Taken together, these examples point to two broad strategies in designing AI provisions: rapid inclusion through strong, binding obligations and more cautious referencing through softer, cooperation-oriented language, which we explore in more detail below.

Table 2: Structure-Location-Commitment of AI Provisions within Trade Agreements

Panel A: Structure of AI Provisions					
Agreement	**Data Privacy**	**Cross-border data flows**	**Open Government**	**Data Sovereignty**	**Domestic Data Infrastructure**
Canada – EU CETA	Specific article	General mention			
CPTPP	Sub-article	Specific article		Specific article	
ASEAN E-Commerce Agreement		General mention			
USMCA	Sub-article	Specific article		Specific article	
US–Japan Digital Trade Agreement	Sub-article	Specific article		Specific article	
China – Mauritius FTA		General mention			
DEPA	Sub-article	Sub-article	Specific article		
Australia–Singapore SADEA (upgraded)	Sub-article	Sub-article			General mention in main text
Japan–UK CEPA	Sub-article	Specific article		Specific article	
RCEP		Footnote 13		Footnote 12	
EU–UK TCA	Specific article	Specific article		Exceptions in	
Korea–Israel FTA		General mention			
Australia–UK FTA	Sub-article	Specific article		Specific article	

Korea–Singapore DTA (KSDTA)	Sub-article	Specific article	Specific article		
Singapore–UK SDEA	Sub-article	Specific article	Specific article		
New Zealand–UK FTA	Sub-article	Specific article	Specific article		
Panel B: Location of AI Provisions					
Agreement	**Data Privacy**	**Cross-border data flows**	**Open Government**	**Data Sovereignty**	**Domestic Data Infrastructure**
Canada – EU CETA	General mention in the main text	General mention in the main text			
CPTPP	General mention in the main text	Dedicated section in the main text		Dedicated section in the main text	
ASEAN E-Commerce Agreement		General mention in the main text			
USMCA	General mention in the main text	Dedicated section in the main text		Dedicated section in the main text	
US–Japan Digital Trade Agreement	General mention in the main text	Dedicated section in the main text		Dedicated section in the main text	
China – Mauritius FTA		General mention in the main text			
DEPA	General mention in the main text	General mention in main text (Module 4,	Dedicated section in main text (Module 5,		
Australia–Singapore SADEA (upgraded)	General mention in the main text	General mention in the main text			General mention in the main text
Japan–UK CEPA	General mention in the main text	Dedicated section in the main text		Dedicated section in the main text	
RCEP		Footnote / interpretative note		Footnote / interpretative note	

EU–UK TCA	Dedicated section in the main text	Dedicated section in the main text		General mention in the main text	
Korea–Israel FTA		General mention in the main text			
Australia–UK FTA	General mention in the main text	Dedicated section in the main text		Dedicated section in the main text	
Korea–Singapore DTA (KSDTA)	General mention in the main text	Dedicated section in the main text	Dedicated section in the main text		
Singapore–UK SDEA	General mention in the main text	Dedicated section in the main text	Dedicated section in the main text		
New Zealand–UK FTA	General mention in the main text	Dedicated section in the main text	Dedicated section in the main text		
Panel C: Commitment of AI Provisions					
Agreement	**Data Privacy**	**Cross-border data flows**	**Open Government**	**Data Sovereignty**	**Domestic Data Infrastructure**
Canada – EU CETA	Recognition – 'Parties recognise the importance of protecting personal data' (Ch.16, Art.16.4)	Encouragement – 'Parties shall endeavour to maintain dialogue on cross-border data issues' (Art.16.5)			
CPTPP	Obligation – 'Each Party shall adopt or maintain a legal framework that provides for the protection of personal information' (Art.14.8(2))	Obligation – 'Each Party shall allow the cross-border transfer of information...' (Art.14.11)		Obligation – 'No Party shall require a covered person to use or locate computing facilities...' (Art.14.13)	
ASEAN E-Commerce Agreement		Encouragement – 'Members agree to facilitate cross-border e-			

		commerce and work towards eliminating barriers' (Art.2(b))			
USMCA	Obligation – 'Each Party shall adopt or maintain a legal framework for the protection of personal information' (Art.19.8(2))	Obligation – 'No Party shall prohibit or restrict the cross-border transfer of information...' (Art.19.11)		Obligation – 'No Party shall require a covered person to use or locate computing facilities...' (Art.19.12)	
US–Japan Digital Trade Agreement	Obligation – 'Each Party shall adopt or maintain a legal framework for the protection of personal information' (Art.17(1))	Obligation – 'Neither Party shall prohibit or restrict the cross-border transfer of information...' (Art.11)		Obligation – 'No Party shall require a covered person to use or locate computing facilities...' (Art.12)	
China – Mauritius FTA		Encouragement – 'Parties shall cooperate to promote electronic commerce' (E-commerce chapter)			
DEPA	Recognition – 'The Parties recognise the importance of protecting personal information' (Module 4, Art.4.5(2))	Recognition – 'The Parties recognise that cross-border data flows enable data-driven innovation' (Module 4, Art.4.3(1))	Obligation – 'Each Party shall endeavour to ensure that government data is made available' (Module 5, Art.5.1)		
Australia– Singapore SADEA (upgraded)	Strong commitment – 'Parties shall endeavour to	Strong commitment – 'Each Party shall endeavour			Encouragement – references to innovation projects and digital identity

	promote compatibility between their data protection frameworks' (Art.26.3(2))	to allow the cross-border transfer of information...' (Art.25.2(1))			cooperation(Digital identity, innovation)
Japan–UK CEPA	Obligation – 'Each Party shall adopt or maintain a legal framework for personal information protection' (Art.8.71(2))	Obligation – 'Each Party shall allow the cross-border transfer of information...' (Art.8.73)		Obligation – 'No Party shall require a covered person to use or locate computing facilities...' (Art.8.74)	
RCEP		Obligation – 'Each Party shall allow the cross-border transfer of information...' but Footnote 13 weakens this (Art.12.15(2))		Obligation – 'No Party shall require the use or location of computing facilities...' but Footnote 12 weakens this (Art.12.14(3)(a))	
EU–UK TCA	Obligation – 'Each Party shall ensure that personal data is protected' (Art.204)	Obligation – 'Each Party shall allow the cross-border flow of data' (Art.201)		Obligation – exceptions framed as 'shall not restrict beyond necessity' (Art.201(2), 202)	
Korea–Israel FTA		Encouragement – 'Parties shall cooperate to facilitate cross-border electronic commerce' (Digital trade chapter)			
Australia–UK FTA	Obligation – 'Each Party shall adopt or	Obligation – 'Each Party shall allow the		Obligation – 'No Party shall require a	

	maintain a legal framework for the protection of personal data' (Art.14.15(2))	cross-border transfer of information...' (Art.14.13)		covered person to use or locate computing facilities...' (Art.14.14)	
Korea–Singapore DTA (KSDTA)	Obligation – 'Each Party shall adopt or maintain measures ensuring protection of personal information' (Art.10(2))	Obligation – 'Each Party shall allow the cross-border transfer of information...' (Art.8)	Obligation – 'Each Party shall ensure government data is available openly' (Art.12)		
Singapore–UK SDEA	Obligation – 'Each Party shall adopt or maintain a legal framework to protect personal information' (Art.12(2))	Obligation – 'Each Party shall allow the cross-border transfer of information...' (Art.10)	Obligation – 'Each Party shall ensure government data is made available in open formats' (Art.14)		
New Zealand–UK FTA	Obligation – 'Each Party shall adopt or maintain a legal framework to protect personal data' (Art.14.14)	Obligation – 'Each Party shall allow the cross-border transfer of information...' (Art.14.9)	Obligation – 'Each Party shall ensure that government data is open and accessible' (Art.14.12)		

Source: Compiled using Medeiro (2016) approach

Table 2 suggests that countries follow two approaches regarding AI provisions in trade agreements, which we refer to as "rapid inclusion" and "cautious referencing". In the case of the former, these groups of countries seek to include specific articles in the main body of the agreement that employ binding language and obligations on the parties. The latter group relies on general mentions using very encouraging but non-binding language. In the case of digital trade, Gao (2018) finds similar results, whereby countries adopt different approaches that he argues partially stem from the differing

perspectives of developed and developing country interests. An interesting aspect of the cautious group of countries is that even where specific articles within the main text contain binding commitments, these are often weakened by broad exceptions, carve-outs, or interpretative notes.

The RCEP agreement (Articles 12.14 and 12.15) illustrates this and addresses the Location of Computing Facilities and the Cross-Border Transfer of Information by Electronic Means. Article 12.14(2) states that, "No Party shall require a covered person to use or locate computing facilities in that Party's territory as a condition for conducting business in that Party's territory" and Article 12.15(2) states "A Party shall not prevent cross-border transfer of information by electronic means where such activity is for the conduct of the business of a covered person" (RCEP, 2024). However, the footnotes attached to those paragraphs introduce several carve-outs, most notably Footnote 12 attached to Article 12.14(3)(a), which states that "For the purposes of this subparagraph, the Parties affirm that the necessity behind the implementation of such legitimate public policy shall be decided by the implementing Party." Similarly, Footnote 14 attached to Article 12.15(3)(a)) states, "For the purposes of this subparagraph, the Parties affirm that the necessity behind the implementation of such legitimate public policy shall be decided by the implementing Party" (RCEP, 2024). These and other footnotes allow for self-judgment of what constitutes a legitimate public policy measure, thereby making the obligations less constraining and more open to regulatory divergence or abuse. Burri and Kugler (2024) report similar use of carve-outs, transition periods, regulatory rights, and exception provisions in the context of digital trade agreements. Burri (2021) suggests that countries are cautious during the early stages of technological development and tend to avoid hard rules when uncertainty prevails. Instead, they use reassessment and review clauses with softer language. Whilst this may not lead to an optimal solution, it nevertheless achieves consensus and agreement amongst the negotiating parties. These patterns reinforce the distinction between rapid inclusion and cautious referencing.

The discussion above suggests that there is considerable heterogeneity in AI provisions in terms of structure, location and commitment. To address RQ1 in a more systematic way, we calculate the AI score for each trade agreement using the criteria shown in Table 1. As stated in our methodology section, this approach captures the breadth and depth of AI-relevant provisions by aggregating the three textual attributes of structure, location, and commitment within each of the five domains of AI, namely data privacy, cross-border data flows, open government data sovereignty/location of computing, and domestic data infrastructure. Each of the textual attributes is summed up to produce a score ranging from 0 to 15, and the overall percentage for the trade

agreement is calculated accordingly. The latter is simply the sum of the scores across the three attributes, divided by the possible total, i.e., 75. The summary results are reported in Table 3.

**Table 3: Overall and Textual Attribute Scores**

	Total Sum	Percentage Score	Structure		Location		Commitment	
			Count	Sum	Count	Sum	Count	Sum
Average	30.00	40%	2.50	8.25	2.50	11.06	2.50	10.69
Mode	40.00	53%	3.00	11.00	3.00	14.00	3.00	15.00
Median	40.00	53%	3.00	11.00	3.00	14.00	3.00	15.00
St Dev	13.38	18%	0.82	3.99	0.82	4.22	0.82	5.58

Table 3 suggests a possible gradual convergence of AI provisions over time, though with incomplete breadth and uneven depth. On average, trade agreements score only 40% (i.e. 30/75). In contrast, the median and mode are higher at 53%, indicating greater breadth and depth of AI provisions in more recent trade agreements than in earlier ones. Disaggregating the textual attributes, we find location and commitment outpaced structure, implying that countries are more willing to elevate AI provisions into the main text and adopt stronger language than to proliferate or refine the structural architecture of the trade agreement. Producing new chapters, articles, sub-articles, and complicated annexes requires greater drafting, interministerial collaboration, and institutional commitment, which is both time-consuming and expensive. Therefore, the negotiating parties tend to employ existing templates and strengthen verbs where appropriate. Our results provide support for the evolution of trade agreements through binding obligations, which advances more rapidly than the development of architecture. Further support for our notion is provided by the standard deviation, which is greatest for commitment than for location and structure, implying that legal force is the principal axis along which trade agreements differ. This suggests that negotiators are less troubled about the location of the AI provisions, but more concerned about their binding nature. The median and mode, both at 53%, indicate a shift towards higher-performing templates, but the large standard deviation of 13.38 shows variability in adoption and legalisation. In the case of gender provisions in trade agreements, Kuhlmann (2023) and Monteiro (2018) find similar results, where the convergence of breadth precedes depth, and standalone gender chapters are a relatively recent innovation.

In Figure 1, we order trade agreements by the date when they were signed , which enables intertemporal reading of how AI provisions have evolved. We find a clear sequencing in the diffusion of AI provisions with breadth preceding depth. Across the three textual attributes, the location is consistently high and often at or near the ceiling

since the signing of the CPTPP. This suggests that AI provisions are being rapidly incorporated into the main text of the trade agreement and are often included as specific articles. The structure supports the earlier finding of a reliance on existing architecture rather than creating new articles or sub-articles. However, we find considerable variability in commitment are the principal source of troughs in the overall percentage scores especially with the ASEAN E-Commerce Agreement, China–Mauritius FTA, and DEPA which have softer verbs such as recognition, encouragement, shall endeavour, whereas CPTPP, USMCA, Japan–UK CEPA, EU–UK TCA and the UK/Singapore agreements include the same AI provisions with hard obligations, thereby raising the overall score to its peaks. This result suggests that cross-country differences impact the evolution of AI provisions. We find that Anglo-Pacific agreements tend to converge on prescriptive, enforceable AI provisions. In contrast, ASEAN/RCEP-centric trade agreements tend to have softer language or broader exceptions[4]. We also find that regional negotiating strategy impacts the argument we formulated earlier, which posits that breadth precedes depth. Whilst this is true for the Anglo-Pacific countries, where the AI provisions appear in the main text before they are given legal force. Hence, the policy trajectory runs from inclusion to legalisation. For ASEAN/RCEP-centric countries, the location and structure are strong, but exemptions and carve-outs weaken the obligations, resulting in mid-range overall percentage scores.

Figure 1: AI Provisions in Trade Agreements Over Time 2017-2024
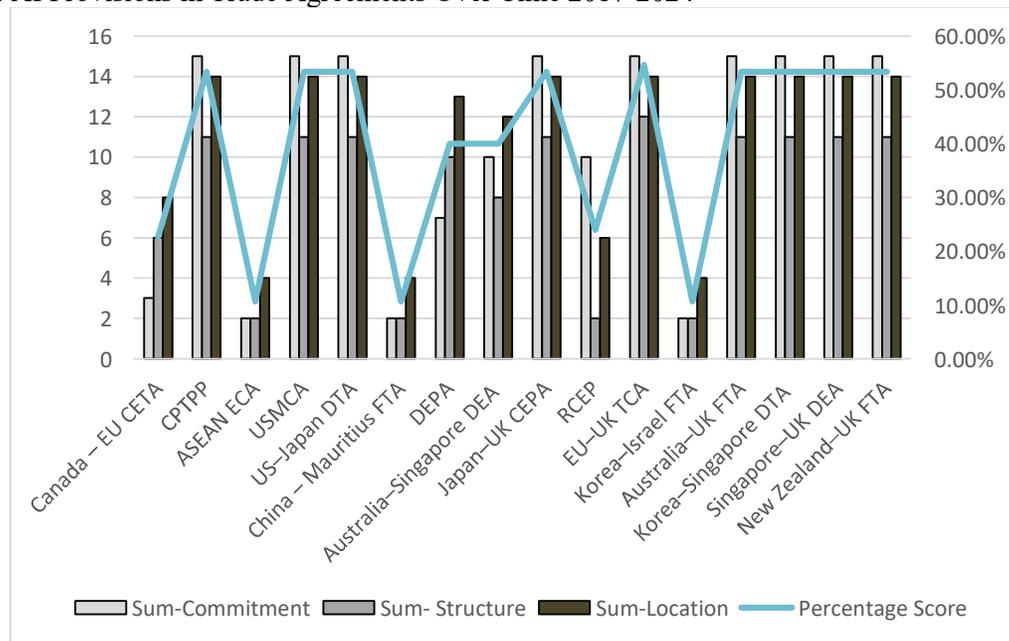
RQ2 – What is the pattern of evolution of AI provisions in trade agreements?
This section focuses on AI provisions that differ significantly in terms of structure, location, and commitment across data privacy, cross-border data flows, open government, data sovereignty/location of computing, and domestic data infrastructure. Structurally, the strongest formal placement tends to be in stand-alone articles on cross-border data flows and the location of computing facilities, whereas data privacy is more frequently embedded in sub-articles or scattered references. Open government data appears as a distinct item only in some of the most recent digital trade agreements and is absent in several others. In terms of location, AI-relevant provisions mostly appear as separate sections within digital trade or e-commerce chapters, but in several agreements they take the form of generic facilitation clauses, which signal support for AI-related cooperation without creating a clearly delineated provision. As noted in the discussion of RQ1, RCEP formally locates key AI-relevant rules in the main text but qualifies them extensively in footnotes, illustrating how visibility in the agreement architecture can coexist with legal caution. Finally, with respect to commitment, many agreements adopt cooperative language and review clauses rather than strict, enforceable disciplines, indicating a preference for flexibility even when structural and locational prominence is high.

Table 4 summarises these patterns using the 0–15 scoring method and captures the weight and visibility of AI provisions in each domain. For structure, there is a clear clustering of AI provisions within sub-articles and specific articles where average scores are around 3.15 for privacy, 3.18 for cross-border data flows, 4.00 for open government data, 3.57 for data sovereignty, and only 2.00 for domestic infrastructure. The mode and median values indicate that cross-border data flows and sovereignty have already reached a relatively high status in the treaty text, while domestic infrastructure remains at the periphery. For location, average scores lie between 4 and 5 across most domains, which suggests that once an AI issue is taken up, it tends to be in the main body of the agreement rather than in annexes or interpretative comments. Commitment, by contrast, is more uneven and cross-border data flows and sovereignty reach higher levels of bindingness, whereas privacy, open government data, and especially domestic infrastructure exhibit weaker and more dispersed obligations. The combination of high locational scores with more modest commitment scores reinforces the RQ1 finding that negotiators broadly agree on the importance of placing AI-relevant rules in core treaty text but are more divided on how strict and enforceable those rules should be.

We identify two forces that drive this chronological convergence across domains: template standardisation and market-access incentives. Countries that frequently negotiate trade agreements tend to replicate successful treaty templates, especially for

cross-border data flows and anti-localisation disciplines, which rapidly raises scores in those domains for later agreements. At the same time, governments are more willing to liberalise data mobility that directly facilitates private-sector trade and investment than to commit on public-sector data or infrastructural policies, leading to persistent troughs for open government data and domestic infrastructure even when other AI provisions peak. The main exception is the Digital Economy Partnership Agreement (DEPA), which scores strongly on open government data and domestic infrastructure and thus illustrates an alternative, cooperation-first pathway to inclusion. Taken together, these domain-specific trajectories complement the agreement-level heterogeneity documented under RQ1 and set the stage for RQ3, where we examine how the accumulation of AI provisions differs across countries and over time, and whether a subset of states emerges as rule-makers while others remain rule-takers.

Table 4 shows the presence of AI-related provisions, as calculated by our scoring methodology, which reveals that they are widespread but unevenly distributed across trade agreements. Cross-border data flows are present in all the trade agreements examined, while data privacy is only present in 76.5% of them. Open government data at 23.5%, data sovereignty at 41.1%, and especially domestic data infrastructure at 5.9% are much less prevalent. This distribution indicates that countries have emphasised the trade aspects of cross-border data flows and, to a lesser degree, privacy protections. At the same time, government-centric governance (including sovereignty and public-sector data) and infrastructural obligations remain relatively unclear. This is consistent with Baccini et al (2015) finding that trade objectives dominate secondary items. Therefore, if the negotiation of secondary items is at risk, countries would rather accept softer rules rather than lose market access. Similarly, Horn et al. (2010) find that countries prioritise market access and trade-related rules, while non-trade provisions only seem to matter when they facilitate trade.

In the case of structure, there is a cluster of AI provisions within sub-articles to specific articles. The averages are 3.15 for privacy, 3.18 for cross-border, 4.00 for open data, 3.57 for sovereignty, and 2.00 for domestic infrastructure. The mode and median values indicate that cross-border and sovereignty often attain specific-article status, whereas domestic infrastructure remains at the periphery. Within the location, we find that AI provisions are included in the main text of the trade agreement. The average scores are between 4 and 5, which suggests that when such provisions are present, they typically manifest as broad references or specific portions within the main text, rather than being confined to annexes or interpretative comments. Overall, the standard deviation is low, reinforcing the view that formal placement is consistent. The average commitment levels are 4.23 for privacy, 3.94 for cross-border data flows, 5.00

for open government data, as well as data sovereignty and 2.00 for data infrastructure. However, there is considerable variation in data privacy and cross-border data flows, indicating a split between trade agreements that employ enforceability and those that use more lenient language. Domestic infrastructure again stands out, as its average is low, which indicates how little and consistently it is treated. The fact that location ratings are high but commitment levels for cross-border data flows are different implies that politicians agree on the importance of data mobility but disagree on how strict the rules should be. Similarly, the consistently low occurrence and feeble obligations for domestic data infrastructure indicate a persisting disparity between digital trade regulations and the supportive public-sector and infrastructural policies that sustain AI ecosystems.

Figure 2 extends this analysis over time by applying the same 0–15 scoring method to each of the five domains for every agreement in the sample. For each agreement, the bar height represents the sum of the structure, location, and commitment scores for a given domain, allowing us to track both the adoption and the depth of AI provisions intertemporally. We identify three waves of evolution. The first wave consists of early agreements in which cross-border data flows and sovereignty appear in basic form, while privacy is weakly specified and open government data and domestic infrastructure are almost entirely absent. A second, mid-period wave is characterised by a general increase in scores for privacy and sovereignty, but open government data and infrastructure remain only partially covered or missing. The third wave begins around the time of the CPTPP and the USMCA and includes agreements such as the EU–UK TCA and the UK–Singapore Digital Economy Agreement; in this group, cross-border flows and sovereignty frequently score near the 12–15 ceiling, privacy and open government data become more systematically regulated, yet domestic infrastructure still lags behind, with low and sporadic scores. Even among these recent templates, provisions on digital identity, interoperability, or data innovation are not treated as core disciplines on par with data mobility and anti-localisation rules.

Table 4: Weight and Visibility of AI Provisions

Panel A: Occurrence in Trade Agreements					
	Data Privacy	**Cross-border data flows**	**Open Government**	**Data Sovereignty**	**Domestic Data Infrastructure**
Count	12.00	16.00	4.00	7.00	1
Presence %	75%	100%	25%	44%	6%
Panel B: Structure of AI Provisions					
Average	3.17	3.19	4.00	3.57	2.00

Mode	3.00	4.00	4.00	4.00	2.00
Median	3.00	4.00	4.00	4.00	2.00
St Dev	0.39	1.05	0.00	1.13	0.00
Panel C: Location of AI Provisions					
	Data Privacy	**Cross-border data flows**	**Open Government**	**Data Sovereignty**	**Domestic Data Infrastructure**
Average	4.08	4.50	5.00	4.57	4.00
Mode	4.00	5.00	5.00	5.00	4.00
Median	4.00	5.00	5.00	5.00	4.00
St Dev	0.29	0.63	0.00	0.79	0.00
Panel D: Commitment of AI Provisions					
Average	4.25	3.94	5.00	5.00	2.00
Mode	5.00	5.00	5.00	5.00	2.00
Median	5.00	5.00	5.00	5.00	2.00
St Dev	1.54	1.53	0.00	0.00	0.00
Panel E: Sum of AI Provisions					
Average	11.50	11.63	14.00	13.14	8.00
Mode	12.00	14.00	14.00	14.00	8.00
Median	12.00	14.00	14.00	14.00	8.00
St Dev	1.57	2.87	0.00	1.86	0.00

Source: Own compilation

Figure 2: Inclusion of AI Provisions by Type Over Time
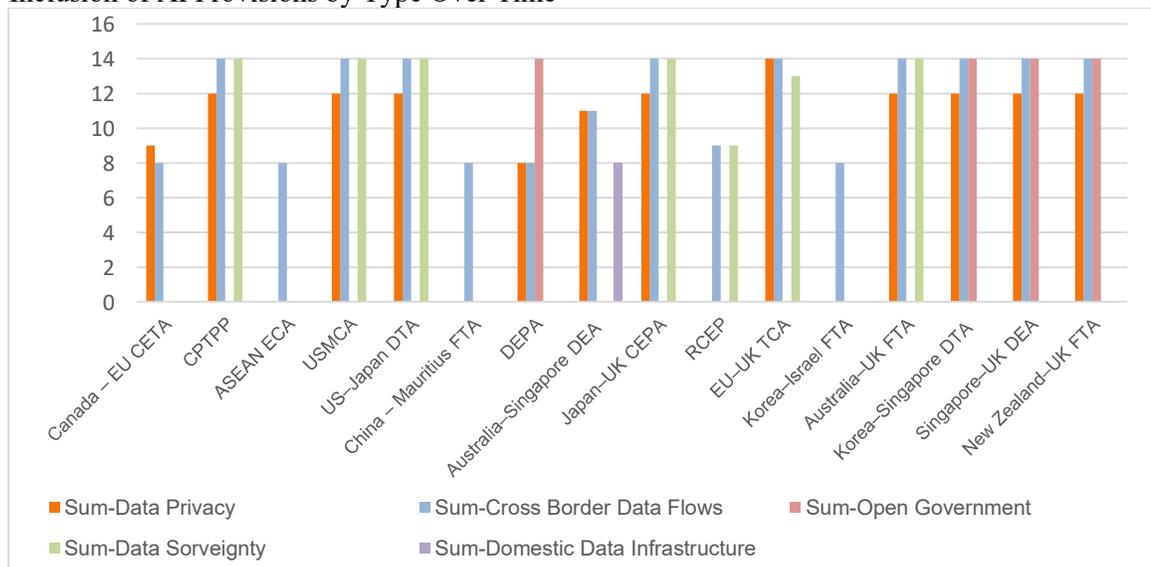
Source: Own compilation

We identify two forces that drive chronological convergence, i.e., template standardisation and market access for the private sector. In the case of the former, we
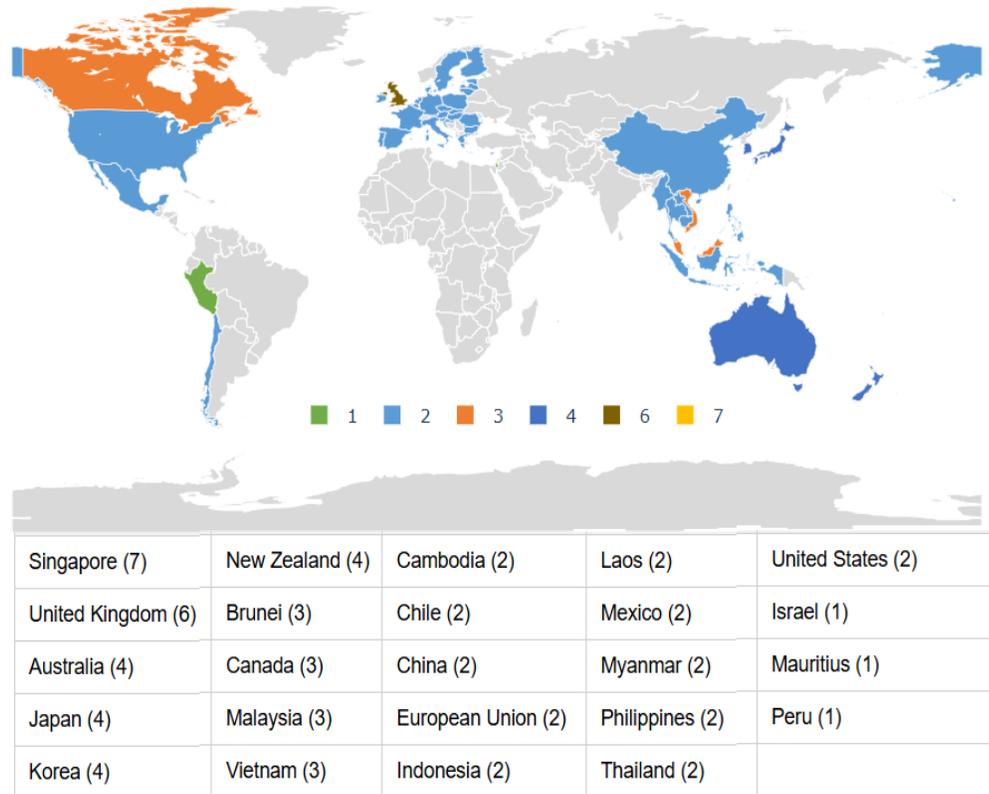
find that countries that frequently include AI provisions or where they are included tend to replicate previous templates, thereby quickly raising the scores of more recent trade agreements. Second, when negotiating trade agreements, governments are more focused on market access for their private sector but more hesitant to liberalise public-sector data or infrastructure. This leads to persistent troughs in those bars even when other AI provisions peak. The exception is DEPA, which scores high on open government data, despite using softer language which signals an alternative, cooperation-first pathway to inclusion.

RQ3: Is there a difference in the evolution of AI provisions between countries that adopt them within trade agreements (across countries)?

To understand the differences between countries, we first examine the list of countries bound by AI provisions in trade agreements, as shown in Figure 3. We find that trade agreement-based AI coverage is highly concentrated in the Anglo-Pacific and Europe, as well as in a handful of Asian countries. Notably absentees are Africa, save for Mauritius, and the Middle East and much of South Asia. Figure 3 highlights that roughly three-quarters of the world's countries are not party to AI Trade provisions. We find that three structural mechanisms explain the pattern. First, prolific signatories tend to replicate their templates across multiple trade agreements, thereby not only raising their count but bringing new nations into the fold. Second, institutional negotiations conducted through regional blocs, such as the EU and ASEAN, create inherited coverage through membership in the organisation. Third, countries, especially developing nations, are brought into the realm of AI trade provisions through mega agreements.

Whilst absenteeism from trade-based AI provisions is widespread, we believe it's also rational, especially for nations that want to ensure they have domestic capacity and regulations in place before entering binding external commitments. Additionally, the rapid pace of AI technological developments and uncertainty regarding its future imply that countries may become risk-averse and avoid its inclusion altogether. Furthermore, smaller and perhaps less developed nations tend to negotiate fewer trade agreements. Hence, they feel that it's more beneficial to focus their limited resources on market access rather than on peripheral areas.

**Figure 3: AI Provisions in Trade Agreements by Country**

Singapore (7)	New Zealand (4)	Cambodia (2)	Laos (2)	United States (2)
United Kingdom (6)	Brunei (3)	Chile (2)	Mexico (2)	Israel (1)
Australia (4)	Canada (3)	China (2)	Myanmar (2)	Mauritius (1)
Japan (4)	Malaysia (3)	European Union (2)	Philippines (2)	Peru (1)
Korea (4)	Vietnam (3)	Indonesia (2)	Thailand (2)	

Source: Own compilation

The policy outcome of this is the emergence of an AI club that is not universal. This creates two key issues, first, fragmentation due to differing groups of agreements and corresponding AI rules. Second, late joiners are often committed to lock-in clauses, which they may not have the power to negotiate against, as switching templates can be costly. Therefore, if the remaining nations are to incorporate AI provisions in trade agreements, then instruments need to be designed that lower the fixed costs of joining and thereby increase the diffusion

To better understand the rate of diffusion, we produce a heatmap showing when countries were bound by AI provisions in trade agreements, as shown in Figure 4. We confirm earlier finding of three waves with a distinct cohort-driven adoption pattern rather than a smooth diffusion based on regional groupings. The latter suggests that countries' timing of AI provisions in trade agreements has more to do with regional blocs rather than domestic capacity alone. A notable feature of Figure 4 is that the

adoption rate flattens sharply after 2022, indicating that a significantly smaller number of countries experience a first-binding event. From a policy perspective, it suggests saturation or, at the very least, a slowdown among well-connected countries to enter new trade agreements and inertia among others in adopting AI provisions. Whilst this approach is insensitive to depth, ie the use of soft cooperation compared to enforceable obligations or even subsequent upgrades, and to signing further agreements, it does nevertheless allow us to understand when the issue of AI provisions in trade agreements becomes relevant to a country.

Figure 4: Heatmap Showing when Countries Started to Apply AI Provisions in Trade Agreements
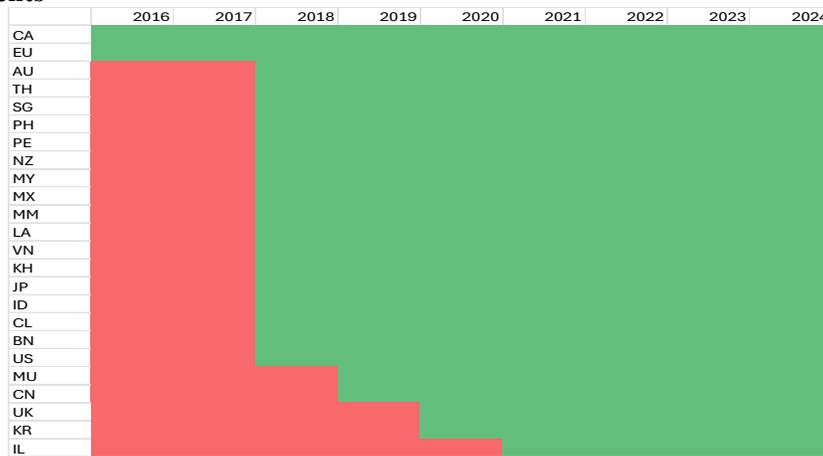
Source: Own compilation

To analyse the intertemporal diffusion of AI-related provisions across countries, we calculate the Agreement AI Index (AAI) based on the year in which the trade agreement was signed. The methodology employed builds upon the scoring criteria shown in Table 1. For each trade agreement, a score is calculated, which is the sum of the three textual attributes, i.e. structure, location, and commitment, and for all five AI provisions: data privacy, cross-border data flows, open government data, data sovereignty/location of computing, and domestic data infrastructure. The AAI is the mean of the five AI provision scores, ranging from 0 to 15. For each country c and year t for every agreement signed by country c, it contributes its AAI stock from the signature year onward; when multiple agreements are signed, contributions accumulate. To assess whether countries follow parallel or heterogeneous trajectories in the accumulation of AI-relevant treaty commitments, we estimate a fixed-effects model with a common linear time trend and country-specific trend deviations as follows:

$$\text{AAI\_stock}_{c,t} = \alpha + \mu_c + \beta\,t + \sum_c \theta_c\,(t \times D_c) + \varepsilon_{c,t}. \quad \text{Equation 1}$$

Where:

AAI_stock$_{c,t}$: the cumulative AI-Agreement Index for country c in year t (i.e. 2016 to 2024).

α: the intercept term

μ_c: a country fixed effect that captures persistent differences unrelated to time.

$\beta\,t$: a common linear time trend of how the average country's stock rises each year.

D_c: a dummy which is 1 for observations of country c and 0 otherwise.

θ_c: *the* country-specific trend coefficient, which *measures* how much *faster or slower* country c AAI stock grows each year relative to the global trend *β*. We also refer to this as a country's pace.

t: time, i.e. from 2016 to 2024

D_c: a country indicator (dummy) variable that equals 1 for observations of country c and 0 for all other countries**.**

$\varepsilon_{c,t}$: the error term for count c and year t.

   To examine whether countries follow parallel or heterogeneous trajectories in the accumulation of AI-relevant trade agreement commitments, we conduct a Wald joint test with the null hypothesis (H0) that no country-specific trend and parallel paths exist (Wooldridge, 2010). We find that the joint Wald test decisively rejects H0 at the 1% level with a test value of $\chi = 3.5465$, and hence we conclude that countries' trajectories are heterogeneous, not parallel. Figure 5 illustrates the AAI stock value in 2024 along with the number of trade agreements signed that contain AI provisions. Confirming earlier discussed results, the data show a small group of active AI adopters who have amassed very high stock values over the period 2016 to 2024. The number of trade agreements with AI provisions signed cannot solely explain the difference in stock value. Figure 5 shows that several mid-tier adopters have signed either comparable or even higher numbers of trade agreements with AI provisions but exhibit substantially lower stock values. This implies that the depth and enforceability of each trade agreement significantly impact the AAI stock value. We find that the Anglo-Pacific group of countries tend to sign trade agreements with AI provisions that are deep and enforceable. In contrast, the ASEAN/RCEP, which, whilst being active in signing trade

agreements with AI provisions, has lower per-treaty scores due to weaker legal enforcement. The weak correlation between the number of trade agreements with AI provisions signed and AAI stock values suggests that contextual attributes, i.e. structure, location, and commitment, are the principal discriminators once basic participation is secured. Our results also suggest that the AAI stock is inherently path-dependent, where countries that develop in-depth templates gain an advantage over latecomers who face switching and harmonisation costs. We find further support for our earlier assertion that AI provisions are club-based. From a methodological perspective, we argue that an AAI stock analysis, as illustrated in Figure 5, provides a richer understanding than a simple frequency-based measure, which may risk overstating convergence.

RQ4. Are some countries rule-makers while others are rule-takers in the case of AI provisions in trade agreements?

To investigate whether the adoption of AI provisions is club-based due to the presence of rule makers or rules takers, we plot each country based on its AAI stock value for 2024 on the x-axis against the pace on the y-axis. The latter is the average country θ value in equation 1, where a high value indicates that the country's AAI is climbing faster each year, while a low number implies its growth is slow, if at all. As shown in Figure 6, these plots exhibit a scattered, positive, and monotonic association with four clusters. The first cluster of scatter plots is for the group of countries that are characterised by high stock and a fast trend. This group of countries is an active signatory to trade agreements with enforceable AI provisions. These countries typically stack multiple high AAI-value trade agreements, which increases their cumulative AAI growth. Second, we have a cluster of countries commitments with upper-mid stock and an accelerating trend, either because they have fewer trade agreements than the first group or because their trade commitments are mixed. A distinctive feature of this group is that, while they have sizable AAI 2024 stock values and their cumulative score is increasing, the breadth across all five AI provisions is less complete than that of the front-runners. Third, we have a cluster of countries with mid–to–low AAI stock values and a modest trend. We find that these countries typically rely on mega-regional participation rather than building their own stock of bilateral trade agreements. Even when they sign mega-agreements, there tend to be carve-outs or transition clauses. The final group are characterised by low AAI stock value and a flat growth trend. Countries in the cluster are typically tied to a single agreement or to frameworks where key obligations are qualified. We find two forces to underpin the scatterplot in Figure 6. First, when countries identify a high-standard template, they tend to replicate it in

subsequent trade agreements, thereby rapidly raising the AAI stock values sharply. Such behaviour is consistent with trade agreement diffusion and design-replication findings. Second, there is considerable asymmetry in the coverage of AI provisions, whereby open government data and especially domestic data infrastructure are thinner than cross-border data flows and anti-localisation rules.

**Figure 5: Countries Ranked by AAI Stock and Number of Trade Agreements Signed**
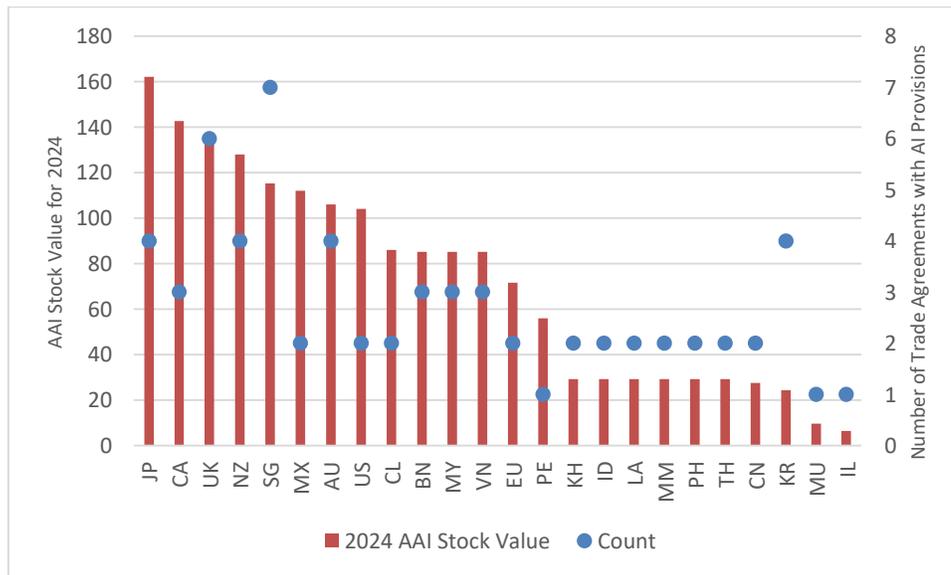
Source: Own compilation

Notes: The UK joined the CPTPP in 2024, and South Korea joined the DEPA in the same year. Their inclusion in this diagram shows that, although they were not founding members, they are still bound by its terms.

We examine whether a group of countries in our sample acts as rule makers, thereby being the originators and diffusers of high-standard texts of trade agreements that incorporate AI provisions. This then implies that the remaining group of countries become rule-takers, adopting essentially existing texts of trade agreements. To identify this group, we segregate the values. AAI stock and pace values are segregated into quartiles based on the median.

Figure 6: AAI Stock Value for 2024 Against the Pace of AI Provision Adoption
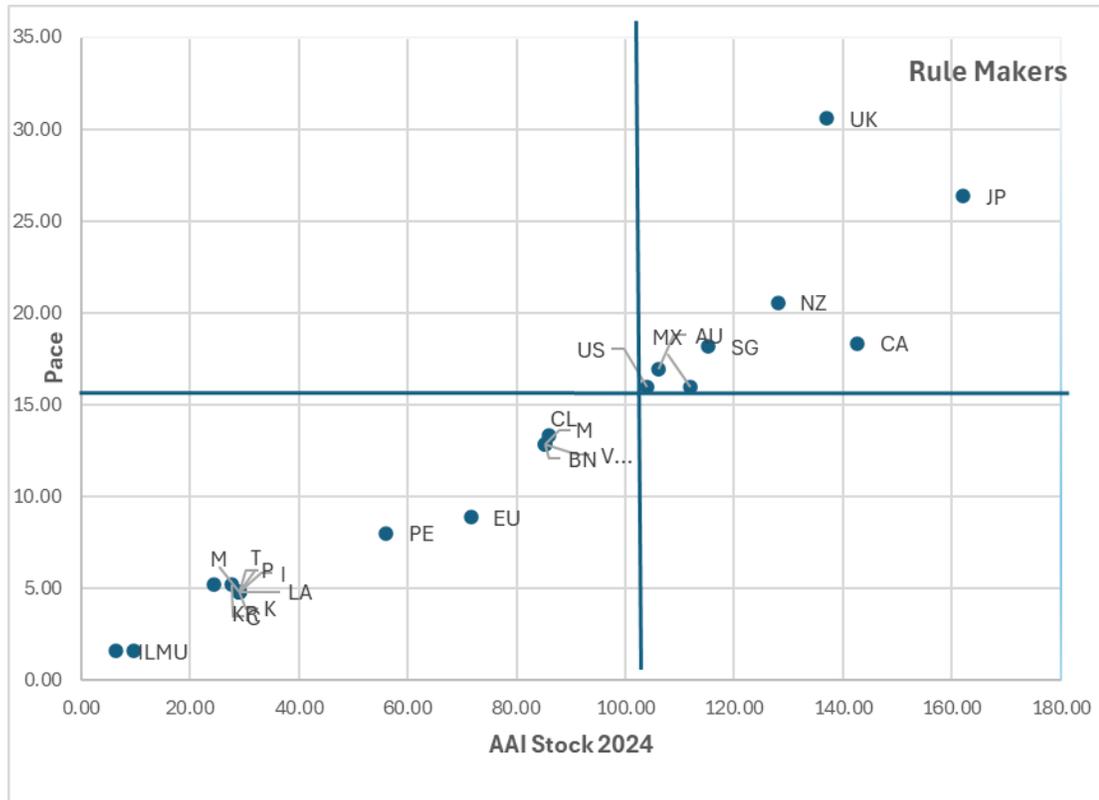
Source: Own compilation

Countries in the top quartile for AAI stock and pace are argued to align with a rule-maker profile, whereas all other countries are assumed to be rule-takers. The rationale is that typically large, institutionally capable, and networked countries are more able than their counterparts and hence act as producers of trade agreement templates (Aaronson and Leblond, 2018; Burri, 2021; Allee and Elsig, 2019; Baier and Bergstrand, 2007; Dur et al., 2014; Hofmann et al., 2017). We posit that rule-takers tend to accede later, accept broader exceptions, and prefer cooperation-oriented or best-effort language choices (Baccini et al., 2015; Lupu and Poast, 2020). Figure 6 shows that this is the case, mapping to lower AAI stock levels and flatter trajectories. Our results find that prolific signatories of trade agreements tend to be rule makers, and they reproduce the text as they negotiate new treaties.

5. *Implications of the Findings*

5.1   *Theoretical Implications*

The findings address ongoing debates on legalisation, deep integration, and club governance in trade and digital regulation. First, we identify where the breadth of AI provisions converges faster than their depth and legal force. This adds to the literature on legalisation, and emphasises differences in obligations, precision, and delegation (Abbott et al., 2000; Allee and Elsig, 2019). The AAI Index and the structure-location-commitment scores show that governments are quickly placing AI-relevant rules in core treaty text and expanding coverage across domains, though the adoption of binding and enforceable language is selective. This suggests that in new areas, countries prioritise visibility and signalling over obligations by using soft or qualified commitments as a staging post towards more legally binding disciplines.

Second, the domain-specific evolution of AI provisions sheds light on how deep integration unfolds across different regulatory pillars of the data-driven economy. In the initial stages, cross-border data flows and anti-localisation disciplines reach high levels of standardisation and binding commitment, while open government data and domestic data infrastructure remain weak. This asymmetry suggests that deep integration in AI-related trade governance is layered. This is done by integrating trade-related mobility of data and market access for digital services in the initial stage, whereas more politically sensitive questions about public-sector data, infrastructural choices, and state capacities are integrated later on if at all. This is aligned with work on issue differentiation and "core–periphery" structures within deep trade agreements (Horn et al., 2010; Baccini et al., 2015).

Third, cross-country trajectories in AAI Index stock and pace confirm that AI-relevant trade governance is emerging through club-like arrangements. A small group of countries, mainly in the Anglo-Pacific and European regions, act as rule-makers by negotiating templates that combine wide domain coverage with strong commitments. Other countries participate as rule-takers, adopt these templates with weaker language, broader exceptions, or more limited domain coverage. This is evident with accounts of regime complexity and club governance, in which overlapping agreements and selective entry create de facto standards that diffuse unevenly across the international system (Raustiala and Victor, 2004; Keohane and Victor, 2011; Aaronson and Leblond, 2018). Our results therefore link the micro-design of AI provisions in trade agreements to broader theoretical claims about how new regulatory regimes emerge and consolidate in a fragmented global order.

5.2   Practical Implications

For countries that function as rule-makers, i.e., those with high AAI stock and fast pace, because by inserting specific configurations of cross-border data flows, localisation disciplines, and privacy or sovereignty rules, these countries are shaping the policy space of their partners and setting benchmarks for the future. This suggests a need for greater transparency about the distributional consequences of AI-related trade provisions, more systematic use of review clauses and built-in flexibility, and closer coordination between trade negotiators and domestic regulators responsible for AI, data protection, competition, and consumer protection. Without such coordination, there is a risk that trade-driven templates will outpace or constrain evolving domestic AI governance frameworks.

For countries that are rule-takers, i.e., those with lower AAI Index scores and limited experience in negotiating digital chapters, the results highlight both risks and opportunities. On the one hand, the inclusion of AI provisions in FTAs can signal openness to digital trade, but this is likely to lock in commitments on data flows and localisation that may be difficult to adjust as domestic AI policies evolve. On the other hand, the prevalence of cautious referencing and having broad exceptions in many agreements shows that it is possible to participate in AI-related trade governance while preserving significant regulatory autonomy.

Finally, from the international organisations perspective, the results highlight the growing need for coordination across trade and AI governance. The emergence of an "AI club" through preferential agreements, with heterogeneous obligations and overlapping membership, risks increasing regulatory fragmentation, and could affect the work of the WTO, OECD, etc. A compilation of model clauses, and best-practice guidelines could help align safeguards on privacy, non-discrimination, and transparency of AI systems across trade agreements, despite different levels of ambition of the negotiating partners to inform the broader architecture of global AI governance.

6. Conclusion

This paper examined how AI-related provisions in trade agreements have evolved over time, across domains and countries. Using a structure-location-commitment framework and the Agreement AI Index, results show that the breadth of commitments converges faster than depth. Further, the analysis evidence that trade agreements prioritise cross-border data flows and data sovereignty over open government data and domestic infrastructure, and that a small group of negotiating countries (mainly in Europe and Asia) act as rule-makers, unlike others that are primarily rule-takers. In terms of future

research, we suggest extending the coverage of agreements to explore the interactions between trade commitments and domestic AI regulatory reforms.

References

Aaronson SA and Leblond P (2018) Another digital divide: The rise of data realms and its implications for the WTO. *Journal of International Economic Law* 21(2): 245–272.

Allee T and Elsig M (2019) Are the content and outcomes of trade agreements determined by the demand for and supply of legalisation? *International Studies Quarterly* 63(4): 1114–1125.

Baier SL and Bergstrand JH (2007) Do free trade agreements actually increase members' international trade? *Journal of International Economics* 71(1): 72–95.

Baccini L, Dür A, Elsig M and Milewicz K (2011) *The design of preferential trade agreements: A new dataset in the making.* World Trade Organization. Available from: www.designoftradeagreements.org/media/filer_public/21/56/21565c19-a05a-497f-81dc-5b4b5c426adc/baccini_dur_elsig_and_milewicz_2014.pdf. (accessed 10 September 2025).

Baccini L, Dür A and Elsig M (2015) The politics of trade agreement design: Explaining the structure of preferences for trade liberalisation. *Review of International Political Economy* 22(6): 1166–1197.

Baldwin R (2011) *21st century regionalism: Filling the gap between 21st century trade and 20th century trade rules*. World Trade Organization Staff Working Paper ERSD-2011-08. Available from: https://www.wto.org/english/res_e/reser_e/ersd201108_e.pdf (accessed 10 September 2025).

Bahri A (2019) Measuring the gender-responsiveness of free trade agreements: Using a self-evaluation maturity framework. *Global Trade & Customs Journal* 14(11): 517–528.

Bahri A and Amaral R (2023) Gender equality provisions in trade and investment agreements: Are they widening the negotiation capacity gap? World Trade Review 22(3): 1–25. https://doi.org/10.1017/S1474745623000368.

Blot E and Kettunen M (2021) Environmental credentials of EU trade policy: A comparative analysis of EU free trade agreements. Institute for European Environmental Policy, Brussels and London. Available from: https://ieep.eu/publications/global-challenges-and-sdgs/environmental-credentials-of-eu-trade-policy (accessed 10 September 2025).

Blot E, Oger A and Harrison J (2022) Enhancing sustainability in EU free trade agreements: The case for a holistic approach. Policy report, Institute for European Environmental Policy (IEEP). Available from: https://ieep.eu/wp-content/uploads/2022/12/Enhancing-sustainability-in-EU-Free-Trade-

Agreements.-The-case-for-a-holistic-approach-IEEP-2022.pdf (accessed 10 September 2025).

Burri M (2021) Towards a new treaty on digital trade. *Journal of World Trade* 55(1): 77–100. Available from: https://digitaltradelaw.ch/wp-content/uploads/2022/08/Burri_Towards-a-New-Treaty-on-Digital-Trade.pdf (accessed 25 September 2025).

Burri M and Kugler K (2024) Regulatory autonomy in digital trade agreements. *Journal of International Economic Law* 27(3): 397–431. http://dx.doi.org/10.1093/jiel/jgae025.

Burri M (2025) Understanding digital economy agreements as a new model of trade governance. *Legal Issues of Economic Integration* 52(3): 219-250.

Duran GM (2023) The EU's evolving approach to environmental sustainability in free trade agreements. In: Wessel RA (ed) EU External Relations Law and Sustainability. T.M.C. Asser Press, The Hague. Available from: https://discovery.ucl.ac.uk/id/eprint/10166279/1/Environmental%20Provisions%20in%20EU%20FTAs%20%28SSRN%29.pdf (accessed 10 September 2025).

Ferencz J, López González J and Oliván García I (2022) *Artificial intelligence and international trade: Some preliminary implications*. OECD Trade Policy Papers 260. OECD Publishing, Paris.

Freund CL and Ornelas E (2010) Regional trade agreements. *Annual Review of Economics* 2(1): 139–166.

Gao HS (2018) Digital or trade? The contrasting approaches of China and US to digital trade. *Journal of International Economic Law* 21(2): 297–321. http://dx.doi.org/10.2139/ssrn.3162557 (accessed 25 September 2025).

George C and Yamaguchi S (2018) Assessing implementation of environmental provisions in regional trade agreements. OECD Trade and Environment Working Papers 2018/01. Available from: https://www.oecd.org/content/dam/oecd/en/publications/reports/2018/03/assessing-implementation-of-environmental-provisions-in-regional-trade-agreements_3cfef8da/91aacfea-en.pdf (accessed 10 September 2025).

Hofmann C, Osnago A and Ruta M (2017) Horizontal depth: A new database on the content of preferential trade agreements. World Bank Policy Research Working Paper 7981. Available from: https://ssrn.com/abstract=2923535 (accessed 10 September 2025).

Horn H, Mavroidis PC and Sapir A (2010) Beyond the WTO? An anatomy of EU and US preferential trade agreements. *The World Economy* 33(11): 1565–1588.

Hulok M (2025) The EU model of AI governance: Regulating artificial intelligence through law and policy. ERA Forum 26: 527–547. https://doi.org/10.1007/s12027-025-00869-1.

Khorana S and Mahate AA (2025) AI, trade policy, and global governance: Evidence from national AI strategies and free trade agreements. Aston University Working Paper.

Kuhlmann K (2023) Gender mainstreaming in trade agreements. In: Making Trade Work for Women. World Trade Organization, Geneva.

Leblond P (2024) Trade agreements and data governance. Centre for International Governance Innovation (CIGI). Available from: https://www.cigionline.org/articles/trade-agreements-and-data-governance/ (accessed 10 September 2025).

Li S and Rojjanakajorn T (2024) AI-related disciplines: A comparative analysis of regional trade agreements and national regulatory approaches. *Journal of World Trade* 59(1): 23–52.

Lino A (2024) What has digital trade brought to trade agreements? Focusing on non-trade concerns. *Public Policy Review* 20(3): 523–544.

Monteiro JA (2016) Provisions on small and medium-sized enterprises in regional trade agreements. WTO Staff Working Paper ERSD-2016-12. World Trade Organization, Geneva. Available from: https://www.wto.org/english/res_e/reser_e/ersd201612_e.pdf (accessed 19 September 2025).

Monteiro JA (2021) The evolution of gender-related provisions in regional trade agreements. WTO Staff Working Paper ERSD-2021-8. World Trade Organization, Geneva. Available from: www.wto.org/english/res_e/reser_e/ersd202108_e.pdf (accessed 10 September 2025).

OECD (2022) Artificial intelligence and international trade. OECD Trade Policy Papers 260. OECD Publishing, Paris.

OECD (2025) Digital trade. Available from: https://www.oecd.org/en/topics/policy-issues/digital-trade.html (accessed 10 September 2025).

Roberts H, Babuta A, Morley J, Thomas C, Taddeo M and Floridi L (2023) Artificial intelligence regulation in the United Kingdom: A path to good governance and global leadership? *Internet Policy Review* 12(2). https://doi.org/10.14763/2023.2.1709.

Ruta M (2016) Preferential trade agreements and global value chains: Theory, evidence, and open questions. In: Global Value Chain Development Report: Measuring and Analysing the Impact of GVCs on Economic Development. World Bank and WTO, Washington, DC and Geneva. Available from: www.wto.org/english/res_e/booksp_e/gvcs_report_2017.pdf (accessed 10 September 2025).

Sisto M and van der Marel E (2025) The trade effects of AI provisions in PTAs: Does non-binding matter? ECIPE Occasional Paper 12/2025.

Wong WH, Duncan J and Lake DA (2025) Why data about people are so hard to govern. *Regulation and Governance* 19: 236–252. https://doi.org/10.1111/rego.12591.

Wooldridge JM (2010) *Econometric Analysis of Cross-Section and Panel Data*. 2nd edn. MIT Press, Cambridge, MA.

World Trade Organization (WTO) (2025) Regional Trade Agreements database. Available from: https://www.wto.org/english/tratop_e/region_e/region_e.htm (accessed 9 September 2025).

World Trade Organization (WTO) (2025) World Trade Report 2025: Making Trade and AI Work Together to the Benefit of All. WTO, Geneva.

Zaidan E and Ibrahim IA (2024) AI governance in a complex and rapidly changing regulatory landscape: A global perspective. *Humanities and Social Sciences Communications* 11: 1121. https://doi.org/10.1057/s41599-024-03560-x.

Trade Agreements

ASEAN (2019), ASEAN E Commerce Agreement, https://cil.nus.edu.sg/wp-content/uploads/2020/11/2019-ASEAN-Agreement-on-Electronic-Commerce.pdf, (Accessed 20 September 2025).

AUKFTA (2021), UK and Australia and Free Trade Agreement, https://assets.publishing.service.gov.uk/media/630344b4e90e0703b020c3fb/CS_Australia_1.2022_Free_Trade_vol5.pdf, (Accessed 20 September 2025).

CETA (2016), Comprehensive Economic and Trade Agreement Between Canada and the European Union and Its Members, https://www.international.gc.ca/trade-commerce/assets/pdfs/ceta-rm-01-eng.pdf, (Accessed 20 September 2025).

CMFTA (2019), China and Mauritius Free Trade Agreements, https://www.mcci.org/media/278863/doc-1-mauritius-china-fta-text.pdf, (Accessed 20 September 2025).

CPTPP (2018), Comprehensive and Progressive Agreement for Trans-Pacific Partnership, https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-in-force/cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership-text-and-resources#bookmark1, (Accessed 20 September 2025).

DEPA (2020), Digital Economy Partnership Agreement,
https://www.mti.gov.sg/Trade/Digital-Economy-Agreements/The-Digital-Economy-Partnership-Agreement, (Accessed 20 September 2025).

EUUKTCA(2021), European Union and the UK Trade and Cooperation Agreement
Agreement,
https://assets.publishing.service.gov.uk/media/608ae0c0d3bf7f0136332887/TS_8.2021_UK_EU_EAEC_Trade_and_Cooperation_Agreement.pdf, (Accessed 20
September 2025).

KIFTA (2021), Korea and Israel Free Trade Agreement,
https://www.gov.il/BlobFolder/policy/israel-south-korea-fta/he/sahar-hutz_agreements_fta-korea-il-en.pdf, (Accessed 20 September 2025).

KSDTA (2021), Korea and Singapore Digital Trade Agreement,
https://www.fta.go.kr/webmodule/_PSD_FTA/ksdpa/1/DPA_eng.pdf, (Accessed
20 September 2025).

NZUKFTA (2022), New Zealand and United Kingdom Free Trade Agreement,
https://www.mfat.govt.nz/assets/Trade-agreements/UK-NZ-FTA/NZ-UK-Free-Trade-Agreement.pdf, (Accessed 20 September 2025).

RCEP (2024), Regional Comprehensive Economic Partnership Agreement,
https://asean.org/wp-content/uploads/2024/10/Regional-Comprehensive-Economic-Partnership-RCEP-Agreement-Full-Text.pdf, (Accessed 20 September
2025).

SADEA (2019), Australia and Singapore Digital Economy Agreement,
https://www.dfat.gov.au/sites/default/files/australia-singapore-digital-economy-agreement.pdf, (Accessed 20 September 2025).

UKJCEPA(2020), UK and Japan Comprehensive Partnership Agreement,
https://assets.publishing.service.gov.uk/media/5f92ecb8d3bf7f35f06ae3bd/CS_Japan_1.2020_UK_Japan_Agreement_Comprehensive_Economic_Partnership__v1.pdf ,(Accessed 20 September 2025).

UKSDEA (2022), United Kingdom and Singapore Digital Economy Agreement,
https://www.mti.gov.sg/Trade/Digital-Economy-Agreements/UKSDEA,(Accessed 20 September 2025).

USJDAT (2019), United States Japan Digital Trade Agreement, (Accessed 20
     September 2025).

USMCA (2018),United States-Mexico-Canada Agreement,
     https://www.trade.gov/sites/default/files/2023-09/fulltext.pdf , (Accessed 20
     September 2025).

Endnotes

[1] The term trade agreements include all notifications in force to the WTO, including regional trade agreements, free trade agreements, comprehensive and economic partnership agreements, etc., up to and including May 2025.

[2] The framework identifies five benchmarks of gender-responsiveness in trade agreements: awareness, affirmations, cooperation and advocacy, institutionalisation, and legally binding obligations and enforcement. These benchmarks are mapped onto a five-level maturity scale, starting with limited and progressing to evolving, acceptable, advanced, and optimising. As such, this provides a structured means of assessing the depth and progression of gender integration as well as how gender provisions are embedded within the institutional and legal architecture of trade agreements. Further, Bahri (2018) argues that this framework, to some extent, encourages a progressive change rather than serving solely as a description of the current state.

[3] These are divided into three types, starting with minimum clauses, which align with current international regulations; high clauses, which exceed international standards by incorporating more stringent domestic regulations; and clauses that reference current and prospective levels of environmental protection in domestic law but remain non-mandatory in nature.

[4] In our classification of the ASEAN/RCEP countries, we do not include Australia, Japan, New Zealand and Singapore. While these countries are part of the RCEP agreement, their other trade agreements have more binding AI provisions; hence, we categorise them with the Anglo-Pacific group.