AI-Related Disciplines: A Comparative Analysis of Regional Trade Agreements and National Regulatory Approaches

Siqi Li* & Rojjanakajorn Tanita**

The global digital economy is witnessing the transformative impact of Artificial intelligence (AI), prompting nations to engage in AI-driven trade agreements. Under the digital trade context, these agreements aim to promote and regulate AI technologies, facilitate international AI cooperation, and touch upon data-related disciplines crucial for AI. This article delves into analysing the emerging trend in specific AI disciplines and other AI-related fields, including data provisions in regional trade agreements (RTAs). It also maps out the current landscape of AI regulatory approaches in the United States (US), the European Union (EU), China, and Singapore to analyse how these diverse domestic regulatory approaches may impact regional AI rulemaking. Findings reveal that RTAs emphasize on AI recognition, AI frameworks, and AI cooperation, albeit in a flexible and soft manner. Besides, while the US's market-driven approach could spearhead rulemaking in AI, its recent policy shifts cast doubt on its comprehensive participation in RTAs. The EU is at the forefront of domestic AI legislation, and seeks to mirror the risk and security-based value at the regional level. China, driven by its massive market potential and concerns about data security, relies on a hybrid approach that explores regulatory strategies alongside AI development. Singapore is notable for taking proactive steps in addressing AI governance through RTAs, which demonstrates a unique form of Asian regionalism. Despite the fragmented approaches among major economies, this article emphasizes on the role of RTAs in addressing trade-related AI issues and puts forward recommendations for AI-specific rulemaking in RTAs.

Keywords: artificial intelligence, data disciplines, regional trade agreements, digital economy agreements, United States, European Union, China, Singapore

1 INTRODUCTION

Artificial intelligence (AI), broadly defined, refers to machines capable of imitating and performing human intelligence through various forms of computing, such as

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machine learning, deep learning, and other automated processes. AI has expanded its transformative impacts on the global economy. According to McKinsey's estimation, by 2030, AI could create additional global economic activities of around thirteen trillion United States (US) dollars.[1] The extensive deployment of AI has pushed policymakers to consider the implications of AI policies related to both virtual (data, software and algorithm) and physical (computing infrastructure) elements of AI.[2] Governments have set out AI regulations to pursue different policy objectives, ranging from achieving economic growth, promoting social welfare, to competing in the global race for technological advancement, among other specific national interests.[3]

The emergence of AI poses formidable challenges to the configuration and reconfiguration of global trade governance. The recent inclusion of AI disciplines into trade agreements highlights the relevance of AI within an international trade context. Governments seek to participate in the AI-driven trade race by negotiating digital trade agreements committed to AI facilitation and regulation.[4] Despite a growing literature in both international law and global governance exploring the opportunities and challenges of AI,[5] scant attention has been devoted specifically to the emergence of regional trade agreements (RTAs) addressing AI-related issues. In an attempt to analyse the interplay between regional trade rules and AI regulation, this article focuses on specific AI disciplines and other AI-related fields, including data provisions in RTAs, and takes examples from the US, European

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1 Jacques Bughin, Jeongmin Seong, James Manyika, Michael Chui & Raoul Joshi, *Notes from the AI Frontier: Modeling the Impact of AI on the World Economy*, McKinsey Glob. Inst. (2018), https://perma.cc/6ZFR-2LRT (accessed 5 Jan. 2024).

2 Laura Galindo, Karine Perset & Francesca Sheeka, *An Overview of National AI Strategies and Policies*, OECD Going Digital Toolkit Note, No. 14 (Aug. 2021), doi: 10.1787/c05140d9-en.

3 Ashkan Alinaghian, Mostafa Safdari Ranjbar & Mehdi Mohammadi, Policy Objectives and Instruments of Artificial Intelligence (AI) Development: Investigating the Policy Programs of Selected Countries, 31(3) Rahyaft 95–122 (2022), doi: 10.22034/rahyaft.2022.10940.1280.

4 Neha Mishra, *Regulating Artificial Intelligence through Digital Trade Agreements*, Hinrich Foundation Report (2022), https://www.hinrichfoundation.com/research/wp/tech/regulating-artificial-intelligence-through-digital-trade-agreements/?utm_term=&utm_campaign=Search+%7C+Generic+%7C+Brand+Awareness&utm_source=adwords&utm_medium=ppc&hsa_acc=8724352572&hsa_cam=18241719097&hsa_grp=147625861160&hsa_ad=644521955253&hsa_src=g&hsa_tgt=aud-666254151587:dsa-2411127348472&hsa_kw=&hsa_mt=&hsa_net=adwords&hsa_ver=3&gad_source=1&gclid=EAIaIQobChMIy8rDjOeChgMV_VwPAh3HWw4BEAAYASAAEgK5APD_BwE (accessed 12 Nov. 2023).

5 For example, recent studies indicate that the rapid deployment of AI technology has brought to light existing fragmentation in digital trade rules. Several key aspects of existing data-related disciplines (e.g., cross-border data flows and data localization) are crucial for AI applications. However, each government implements varying approaches towards these data measures, affecting AI differently. *See* Iqbal H. Sarker, *AI-Based Modelling: Techniques, Applications and Research Issues Towards Automation, Intelligent and Smart Systems*, 3(2) SN Computer Sci., 158 (2022), doi: 10.1007/s42979-022-01043-x. Other research raises questions regarding the adequacy of existing legal frameworks to address the unique challenges posed by AI. *See* Han-Wei Liu & Ching-Fu Lin, *Artificial Intelligence and Global Trade Governance: A Pluralist Agenda*, 61(2) Harv. Int'l L.J. 407–450 (2020), https://journals.law.harvard.edu/ilj/wp-content/uploads/sites/84/61.2-Liu.pdf (accessed 10 Nov. 2023).

Union (EU), China and Singapore to analyse the diverse regulatory approaches to AI and their implications for regional AI rulemaking. The discussions provide insights into the emerging trends of AI governance within the current fragmented digital rules framework.

This article is organized as follows: section II presents the current landscape of AI-related disciplines in RTAs. Section III analyses the diverse regulatory approaches towards AI of the US, EU, China and Singapore. Section IV analyses the prospect of AI governance at the regional level, focusing on the role of RTAs. Section V concludes.

2 CURRENT LANDSCAPE OF AI-RELATED DISCIPLINES IN RTAs

Over the past decade, digital trade issues have increasingly become central to RTAs. **Based on the Trade Agreement Provisions on Electronic Commerce and Data (TAPED) dataset, as of November 2023, there are a total of 214 RTAs that include digital trade-related provisions and 122 RTAs contain stand-alone digital trade chapters.**[6] **The scope and depth of digital trade-related** provisions **in RTAs** vary markedly. More **recent RTAs** demonstrate a broader and deeper reach in tackling digital trade issues. For instance, the Comprehensive Progressive Trans-Pacific Partnership (CPTPP) notably expands the ambit of digital trade-related disciplines in response to the growth of digital trade and e-commerce, incorporating provisions on the protection of free data flow and prohibition of data localization.[7] The demonstration effect of CPTPP is perceptible in the surge of RTAs addressing digital trade issues that have followed since 2018 (*see* Figure 1).

Differing from traditional digital trade issues, AI presents a considerable challenge for RTAs and national policymakers. While AI is recognized for its role in facilitating trade by optimizing global supply chain and driving new digital economic growth, its potential as a disruptive technology upon deployment poses risks to various industries and markets. Concerns associated with AI also extend to policy-related issues of data privacy and human rights.[8] Therefore, in the realm of governing digital trade rules, the integration of AI disciplines has become increasingly important. A growing number of RTAs have recognized the transformative impact of AI on global commerce and have sought to incorporate provisions

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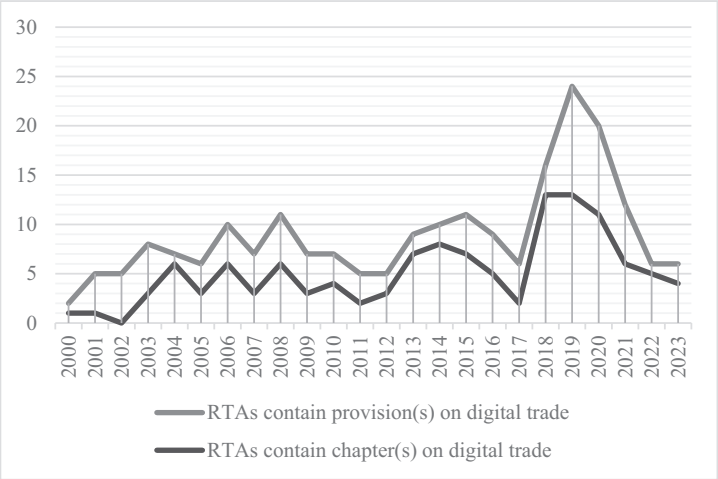
[6] Mira Burri, Maria Vasquez Callo-Müller & Kholofelo Kugler, *TAPED: Trade Agreement Provisions on Electronic Commerce and Data*, University of Lucerne (2 Nov. 2023), https://www.unilu.ch/en/faculties/faculty-of-law/professorships/burri-mira/research/taped/ (accessed 5 Nov. 2023).

[7] Hosuk Lee-Makiyama, *Briefing Note: AI & Trade Policy*, Tallinn Digital Summit (2018), https://ecipe.org/wp-content/uploads/2018/10/TDS2018-BriefingNote_AI_Trade_Policy.pdf (accessed 15 Dec. 2023).

[8] Shin-Yi Peng, Ching-Fu Lin & Thomas Streinz, *Artificial Intelligence and International Economic Law,* In Cambridge U. Press eBooks 1–26 (2021), doi: 10.1017/9781108954006.002.

covering multiple areas such as data flow, privacy, regulatory cooperation, data innovation, and source code protection. These provisions are designed to establish a harmonized and ethical framework for incorporating AI disciplines into international trade agreements. Presently, five RTAs feature provisions specifically dedicated to AI: The Australia-Singapore Digital Economy Agreement (ASDEA), the Digital Economy Partnership Agreement (DEPA), the United Kingdom-Singapore Digital Economy Agreement (UKSDEA), the United Kingdom-New Zealand Free Trade Agreement (UKNZFTA), and the Korea-Singapore Digital Partnership Agreement (KSDPA).

Figure 1 The Number of RTAs Addressing Digital Trade Issues During 2000 to 2023



Source: The authors' observation based on TAPED Dataset (November 2023 Version)

2.1 Specific AI disciplines in RTAs

As shown in Table 1, the five reviewed RTAs vary in the breadth of AI-specific provisions. The DEPA is distinctive not only as the first stand-alone digital trade agreement, but also as the first enforceable agreement to incorporate a clause solely dedicated to AI. This inclusion serves as an early indication of the significance of AI in the global economy, and reflects the interests of DEPA signatories in addressing challenges of AI at the regional level. The Article 8.2 of Module 8 of the DEPA is considered a foundational clause on AI. Utilizing the DEPA's AI-specific provisions as a reference point, and considering other RTAs with AI

provisions, three overarching AI objectives embedded within RTAs emerge: AI recognition, AI frameworks, and AI cooperation. Each objective includes provisions that guide or regulate AI-related issues. Preliminary assessments suggest that the UKSDEA covers a wide range of AI-related issues, positioning it as a front-runner in this domain, despite not being the most recently ratified.

Table 1 The Coverage of AI-Specific Provisions in Typical RTAs

Objectives	Provisions	DEPA	ASDEA	UKSDEA	UKNZFTA	KSDPA
AI recognition	The adoption of AI	✓	✓	✓	✓	✓
	Importance of AI's role in international trade	✓	✓	✓	✓	✓
	Economic benefits of AI	✗	✓	✓	✓	✓
AI frameworks	International principles/guidelines or bodies for AI governance framework	✓	✓	✓	✓	✓
	Ethical AI frameworks for trusted, safe and responsible usage of AI	✓	✓	✓	✓	✓
	Explainability, transparency, fairness and human-centred values	✓	✗	✗	✗	✗
	Risk-based approaches	✗	✗	✓	✓	✗
	Technological interoperability and neutrality	✗	✗	✓	✓	✗
AI Cooperation	Exchanging/sharing AI related information and experiences	✗	✓	✓	✓	✓
	Cooperating on AI development issues	✗	✗	✓	✓	✗
	AI commercialization	✗	✓	✓	✗	✗
	Collaboration of governments and academics related to AI opportunities	✗	✗	✓	✗	✗
	Participating in AI-related international fora	✗	✗	✓	✓	✗

Source: The authors' analysis based on official trade agreement texts.

Note: (1) the UKNZFTA does not explicitly contain provisions dedicated solely to AI like other digital economic agreements (DEAs) listed in Table 2, but it does acknowledge AI within its definition of 'Emerging Technology' in Article 15.1. Furthermore, the Article 15.19 of the UKNZFTA elaborates on issues pertaining to digital innovation and emerging technologies.

(2) The agreements in Table 1 are in a chronological order based on their dates of signature. The progression commences with the DEPA in June 2020, followed by the ASDEA in August 2020, the UKSDEA in February 2022, the UKNZFTA also in February 2022, and the KSDPA in November 2022.

2.1[a] *AI Recognition*

In the five reviewed RTAs, none of them included a concrete definition of AI in the text. The absence of a fixed and agreed-upon definition of AI is not limited to the realm of trade agreements, but also occurs in other fields related to AI, reflecting the daunting task for countries to come up with a satisfactory definition through legislation or normative means.[9]

While there is a lack of a universally agreed AI definition, the reviewed RTAs underscore the adoption, important role, and economic benefits of AI. According to Article 8.2(1) of the DEPA, signatories acknowledge the widespread adoption of AI within the digital economy. The Article 31(1) of the ASDEA further emphasizes the importance of AI in the digital economy and the significant social and economic benefits of AI adoption for both individuals and businesses. The ASDEA has informed subsequent RTAs to address the wide adoption, importance and benefits of AI in the digital economy,[10] as evidenced by similar provisions in the KSDPA, UKSDEA and UKNZFTA. More specifically, the AI recognition-related text in the KSDPA is word-by-word identical to that in the ASDEA.[11] Comparatively, the UKSDEA and UKNZFTA provide a more nuanced view on AI recognition.[12] These provisions differ from other agreements in two aspects. Firstly, while other agreements acknowledge the 'important role' of AI in the digital economy in general terms, the UKSDEA and the UKNZFTA specifically highlight the potential of AI to enhance economic competitiveness and facilitate global trade and investment. This emphasis may reflect the interests of signatories to employ AI as a catalyst for their digital trade and economic growth. Secondly, both agreements acknowledge the necessity of coordinated efforts across various trade policy areas. This suggests that the UK, Singapore, and New Zealand are advocating for synergistic cooperation in trade policy and rulemaking, aiming to maximize the integral benefits of AI for their economies.

2.1[b] *AI Frameworks*

The second objective concerning AI frameworks in RTAs addresses principles central to AI governance, with each agreement specifying disciplines related to these principles. There are five components within the AI frameworks: (1) adherence to international principles or guidelines for the development of AI

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[9] Stuart Russell & Peter Norvig, *Artificial Intelligence: A Modern Approach* (Global ed. Pearson Higher ed. 2021).

[10] *See* Art. 8.61-R(1) in UKSDEA, Art. 14.28(1) in KSDPA, and Art. 15.19 in UKNZFTA.

[11] *See* Art. 14.28(1) in KSDPA and Art. 31(1) in ASDEA.

[12] *See* Art. 8.61-R(1) in UKSDEA and Art. 15.19 (1)(2a) in UKNZFTA.

governance frameworks; (2) the adoption of ethical AI frameworks to ensure trusted, safe and responsible use of AI; (3) the principles of explainability, transparency, fairness and human-centred values; (4) the risk-based approaches; and (5) the principles of technological interoperability and neutrality.

2.1[b][i] International Principles or Guidelines

Collectively, RTAs with AI-specific provisions exhibit a common tendency to encourage signatories to consider international principles or guidelines in a best endeavour manner when adopting AI governance frameworks.[13] Notwithstanding their similarities, there are distinctions worth mentioning in the UKSDEA and the UKNZFTA. They explicitly acknowledge the importance of engaging with relevant international bodies, a detail not specified in the DEPA, ASDEA, or KSDPA. The UKNZFTA specifically refers to the Organization for Economic Co-operation and Development (OECD) and the Global Partnership on Artificial Intelligence (GPAI), indicating that signatories, especially the UK, recognize the value of these organizations in contributing to the ongoing development of AI frameworks. In contrast, the absence of specified international bodies in the DEPA, ASDEA and KSDPA leaves broader latitude for interpretation, and may indicate both an earlier stage in the development of AI governance bodies and a potential lack of consensus on the efficacy of existing frameworks during the time of negotiation.

2.1[b][ii] Ethical AI Frameworks

A majority of RTAs follow DEPA's lead in adopting ethical AI frameworks, with the ultimate goal of promoting trusted, safe and responsible usage of AI. For instance, Article 8.2(3) of the DEPA encourages its signatories to 'promote' the adoption of ethical AI frameworks. The ASDEA and the KSDPA further call on the parties to 'collaborate and promote', highlighting the importance of international cooperation for developing ethical AI frameworks.

2.1[b][iii] Other Principles of AI Governance

Firstly, both Article 8.61-R(2) of the UKSDEA and Article 15.19(3) of the UKNZFTA encourage parties to actively participate in developing 'governance and policy frameworks' for AI. This participation may indicate a higher level of

[13] *See* Art. 8.2(4) in DEPA, Art. 31(2) in ASDEA, Art. 8.61-R(2)(a) in UKSDEA, Art. 14.28(3)(b) in KSDPA, and Art. 15.19(3)(a) in UKNZFTA.

preparedness and maturity regarding AI governance, integration and deployment among the participating parties.

Secondly, Article 8.2(4) of the DEPA encourages parties to consider specific AI principles, including explainability, transparency, fairness, and human-centred values. At the time of writing, none of the agreements that came into force after the DEPA have included these specific principles.

Thirdly, recent developments in the UKSDEA and the UKNZFTA highlight a risk-based approach to AI governance,[14] and the necessity of technological interoperability and neutrality. These principles offer a nuanced and balanced perspective on AI governance.

2.1[c] *AI Cooperation*

The inclusion of the third objective 'AI cooperation' indicates a recent development in AI-related provisions. This objective is absent in the DEPA (refer to Table 1), while it has been included in subsequent agreements. Five key aspects of AI cooperation are identified: (1) Exchange of AI-related information and experiences; (2) Cooperation on AI development issues; (3) Cooperation on AI commercialization; (4) Cross-field collaboration for AI; and (5) Participation in international AI fora.

2.1[c][i] Exchange of AI-Related Information and Experiences

The ASDEA was the pioneering agreement that encouraged the parties to exchange AI-related information and practices in a broad manner.[15] Other agreements have since addressed this matter. The UKSDEA has specified areas such as research and industry activities, laws, regulations, policies, enforcement and compliance, in which the AI-related information sharing should be promoted.[16] Additionally, it also emphasizes the importance of interoperability between international AI governance frameworks, which is a distinct feature of the UKSDEA that is not explicitly mentioned in other agreements.

2.1[c][ii] Cooperation on AI Development Issues

Of all five agreements, only the UKSDEA and the UKNZFTA incorporate specific provision regarding cooperation on AI development issues, such as ethical

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14 *See* Art. 8.61-R(2)(b) and R(2)(c) in UKSDEA and Arts 15.19(3)(b) and 15.19(3)(c) in UKNZFTA.
15 *See* Art. 31(1)(a) in ASDEA.
16 *See* Art. 8.61-R(3)(a) in UKSDEA.

use, human diversity and unintended biases, industry-led technical standards and algorithmic transparency.[17] Notably, the UKNZFTA addresses the necessity of recognizing human diversity in the development of emerging technologies to address issues such as unintended biases and exacerbation of existing divides.

2.1[c][iii] Cooperation on AI Commercialization

Both the ASDEA and the UKSDEA prioritize collaborative opportunities for AI commercialization with the latter specifically highlights the promotion of investment in AI.[18]

RTAs can play a crucial role in facilitating the AI commercialization through favourable mechanisms. Firstly, by easing market access through RTAs, countries can open up their markets for AI products and services, allowing firms to tap into a larger pool of potential customers. This expanded access can reduce costs of AI commercialization through economies of scale and increased revenue streams from a broader market base. Secondly, the harmonization or mutual recognition of AI standards through technical cooperation of RTAs can make it easier for AI firms to comply with technical regulations, reduce the complexity and cost of entering new markets, and minimize the barriers to cross-border trade in AI technologies. Thirdly, AI innovation is often driven by diverse knowledge and expertise, which international cooperation can provide. Joint investments in AI by RTA signatories can enable the development of specialized AI innovation clusters. These clusters can scale up AI technologies across borders more efficiently, allowing businesses to leverage shared infrastructures like cloud computing resources or harmonized data sets for AI training.

2.1[c][iv] Cross-Field Collaboration for AI

Collaboration for AI opportunities involves multi-stakeholders from government, non-governmental organizations (NGOs), academia, and business sectors. The ASDEA is the first agreement to advocate for such cross-field collaboration.[19] The UKSDEA further specifies collaboration on AI research and development, AI joint deployment and test-bedding, and responsible use and adoption of AI technologies.[20] In contrary, the KSDPA and the UKNZFTA do not explicitly mention this aspect of AI cooperation.

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17 *See* Art. 8.61-R(3)(b) in UKSDEA and Art. 15.19(4)(b) in UKNZFTA.
18 *See* Art. 31(1)(c) in ASDEA and Art. 8.61-R(3)(c)(iii) in UKSDEA.
19 *See* Art. 31(1)(c) in ASDEA.
20 *See* Art. 8.61-R(3)(c)(i, ii and iv) in UKSDEA.

2.1[c][v] Participation in International AI Fora

The UKSDEA and the UKNZFTA are the two agreements that specifically encourage the parties to actively participate in international fora on matters concerning the interaction between trade and AI.[21] The UKSDEA refers to international fora such as GPAI, while the UKNZFTA does not specifically address any.

2.1[d] *Key Features of AI-Specific Provisions In RTAs*

There are four key features of AI-specific provisions in the reviewed RTAs, which highlight the current landscape of AI rulemaking in RTAs.

(1) Brief and Concise Legal Text: The AI-specific provisions in the reviewed RTAs are generally brief and concise when compared to other digital-related provisions. The word count for these provisions ranges from 150 to 350 words, with the AI provisions in the DEPA being notably concise, and those in the UKSDEA comparatively extensive.

(2) Flexible and Soft Commitments: The RTAs offer institutional flexibility to AI regulation in two aspects. Firstly, none of the reviewed RTAs provide a concrete definition of AI. The absence of a definition of AI indicates challenges in establishing a clear scope for AI governance and allows for varying interpretations regarding the implementation of AI-specific provisions. On the one hand, this approach allows for flexibility to adapt to the evolving landscape of AI technologies. On the other hand, this approach may create legal ambiguity and uncertainty in AI regulations. Subtle differences in AI definition or overlapping AI terminology can hinder policymakers from effectively categorizing and regulating AI.

Secondly, the legal nature of the AI-specific provisions across all existing RTAs is soft without robust enforcement mechanism. These agreements encourage signatories to make 'best efforts' to comply with AI commitments. Phrases indicating non-binding commitments, such as 'recognize the importance', 'acknowledge the benefit', and 'promote', are prevalent. Although the term 'shall' traditionally implies a binding commitment, its conjunction with additional verbs modifies its meaning to suggest encouragement, as seen in expressions like 'shall endeavour' and 'shall cooperate'. Additionally, the RTAs offer flexibility for AI-embedded products or services by providing certain exceptions to the dispute settlement.[22]

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[21] *See* Art. 8.61-R(3)(d) in UKSDEA and Art. 15.19(4)(c) in UKNZFTA.

[22] For instance, Annex 14-A of the DEPA excludes Art. 3.3 (Non-discriminatory Treatment of Digital Products), Art. 3.4 (Information and Communication Technology Products that Use Cryptography), Art. 4.3 (Cross-Border Transfer of Information by Electronic Means) and Art. 4.4 (Location of Computing Facilities) from the scope of dispute settlement.

(3) Emphasis on International Cooperation: The AI-specific provisions prioritize international cooperation over protectionist measures. They encourage knowledge sharing and best practices for AI development, deployment, commercialization, and rulemaking. Recognizing the global challenges posed by AI, these provisions emphasize coordinated actions by stakeholders at domestic and regional levels, and stress the importance of utilizing international standards to foster mutual recognition and cooperation among signatories.

(4) Concentrated Among a Few Nations: Most agreements that include AI-specific provisions are bilateral, while the DEPA is an example of a regional agreement. The signatories in these agreements represent a select group of nations, reflecting the diverse capacities of economies to align with technological advancements in rulemaking. These trade agreements strategically align nations with similar interests and potentials in AI development. Notably, most signatories rank among the top twenty countries in the 2023 World Digital Competitiveness Ranking,[23] showcasing their advanced digital readiness and competitiveness. Moreover, these nations often rank first or second within their respective regions in terms of Government AI Readiness Index. The East Asia and Pacific region has consistently been at the forefront of AI research publications from 2010 to 2021, contributing approximately 47.1% of global output.[24] Singapore, in particular, plays a prominent role in this landscape, especially in the Asia-Pacific region.

2.2 Other disciplines related to AI

There are additional disciplines that are vital for governing and facilitating AI's technological advancements across countries. In this section, eight typical RTAs are analysed to provide an overview of data-related disciplines and digital cooperation provisions relevant to AI (refer to Table 2). While these issues are crucial, they do not fully encompass the complexity and diversity of AI in the global trading system. However, due space limitations, other aspects such as source code, algorithms, intellectual property rights, and cybersecurity, though relevant to AI, fall outside the scope of our analysis.

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[23] World Digital Competitiveness Ranking (2023), https://www.imd.org/centers/wcc/world-competitiveness-center/rankings/world-digital-competitiveness-ranking/ (accessed 10 Jan. 2024).

[24] Nestor Maslej, Loredana Fattorini, Erik Brynjolfsson, John Etchemendy, Katrina Ligett, Terah Lyons, James Manyika, Helen Ngo, Juan Carlos Niebles, Vanessa Parli, Yoav Shoham, Russell Wald, Jack Clark & Raymond Perrault, *The AI Index 2023 Annual Report*, AI Index Steering Committee, Institute for Human-Centered AI, Stanford University, Stanford, CA (Apr. 2023), https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf (accessed 20 Jan. 2024).

Table 2 The Depth of Commitments on AI-Related Data and Digital Cooperation Provisions of Typical RTAs

	Themes	Issues Covered in Provisions	CPTPP	USMCA	JUSDTA	DEPA	ASDEA	RCEP	UKSDEA	KSDPA
DATA-Related	*Data Flow*	Cross-border transfer of information	●	●	●	●	●	●	●	●
		Exceptions for data flows	◐	◐	◐	◐	◐	◐	◐	◐
		Barriers to data flows	○	○	○	○	◐	○	○	○
		Future provisions on data flows	○	○	○	○	○	◐	○	○
	Data Localization	Location of computing facilities	●	●	●	●	●	●	●	●
	Data Protection	Protection of personal data/data privacy	◐	◐	◐	◐	◐	◐	●	●
		Data protection based on domestic law	●	●	◐	●	●	●	○	○
		Inclusion of Key principle of data protection	○	◐	○	◐	◐	○	●	●
		Reference of international standards of data protection	◐	◐	○	○	●	●	●	●
	New Data Issues	Open data	○	◐	◐	◐	◐	○	◐	◐
		Data Innovation	○	○	○	◐	◐	○	◐	◐
Others	*Digital Cooperation*	Digital Inclusion	○	○	○	◐	○	○	◐	○
		Cooperation	◐	◐	○	○	◐	◐	◐	◐
		Capacity Building	○	○	○	○	◐	○	◐	○

◐ : Non-binding (soft commitments), ● : Binding (hard commitments), ○: Not covered

Source: The authors' observation and analysis based on TAPED Dataset (November 2023 version) and official trade agreement texts.

2.2[a] *Data Disciplines*

AI relies heavily on data throughout its lifecycle, encompassing development, design, and deployment stages.[25] High-quality data is essential not only for training AI systems, but also for enabling AI to perform its tasks. For that reason, any provision that constrains data access, irrespective of its initial intent, can substantially impact AI technologies.

As shown in Table 2, variations are evident in the commitments of AI-related data provisions across RTAs in terms of (1) data flow; (2) data localization; (3) data protection; and (4) new data issues. All the reviewed RTAs contain binding provisions on cross-border data flow and data localization, which are significant

[25] Rohit Sehgal, *AI Needs Data More Than Data Needs AI*, Forbes (5 Oct. 2023), https://www.forbes.com/sites/forbestechcouncil/2023/10/05/ai-needs-data-more-than-data-needs-ai/?sh=59c006ba3ed0 (accessed 20 Jan. 2024).

for AI as they affect data accessibility via cloud services and Application Programming Interfaces (APIs). Additionally, these RTAs either introduce non-binding provisions or contain no provisions on data protection and new data issues.

2.2[a][i] Data Flow

Reconciling the principles of data flow with the imperatives of AI innovation presents significant challenges. AI systems frequently require access to extensive datasets from diverse sources and rely on rapid, real-time, cross-border data flows. Imposing restrictions on data flows across borders may limit access to data necessary for the development and enhancement of AI technologies. However, allowing unrestricted data flow across national boundaries can lead to concerns regarding data sovereignty, jurisdictional disputes, and the risk of unauthorized access or misuse of personal data.[26]

Compared to RTAs in the early 2000s, such as the US-Jordan Joint statement on e-commerce and the US-Korea FTA, more recent RTAs generally contain more elaborate provisions on data flow. Some agreements, such as the CPTPP and USMCA, support cross-border data flow and permit the transfer of personal information through electronic means. They stipulate that any restrictions, when justified for legitimate policy objectives, should not be used as disguised trade barriers or discriminatory practices.[27] Other agreements, like the RCEP, take a more prudent and incremental approach, acknowledging the right of countries to restrict data flow for the protection of essential security interests on the one hand,[28] and on the other hand setting the possibility of further dialogue on cross-border data flow in the context of promoting electronic commerce.[29]

2.2[a][ii] Data Localization

Disciplines on data localization, also referred to as 'location of computing facilities', generally prohibit requirements mandating the specific location of computing facilities within a particular jurisdiction as a condition for conducting business. Recent Asia-Pacific RTAs mirror similar language and exceptions in their data localization provisions, permitting legitimate policy measures provided

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[26] W. Gregory Voss, *Cross-Border Data Flows, the GDPR, and Data Governance*, 29(3) Wash. Int'l L.J. 485–531 (2020), https://digitalcommons.law.uw.edu/wilj/vol29/iss3/7.
[27] *See* Art. 14.11 in CPTPP, Art. 19.11 in USMCA.
[28] *See* Art. 12.15(3) in RCEP.
[29] *See* Art. 12.16(1)(b) in RCEP.

they do not obscure trade restrictions or demonstrate arbitrary discrimination.[30] However, the US-led agreements notably lack any exceptions to data localization requirements.[31]

Contrary to this, the EU-UK Trade Cooperation Agreement prohibits data localization requirements, while this discipline is notably absent in other EU-led agreements like the recent EU-Singapore Digital Partnership. The EU's approach avoids a blanket prohibition of data localization in its RTAs to ensure flexibility and customize agreements based on each partner's specific needs, understanding that some countries may have legitimate reasons for data localization requirements. This pragmatic approach enables a more nuanced and balanced negotiation process.

The impact of data localization provisions on AI development depends on the stringency of these requirements. Stringent data localization requirements will hinder innovation by limiting access to essential data for training AI models, while flexible regulations will foster AI development by promoting global data sharing and collaboration. Many recent RTAs contain clauses that prohibit data localization, fostering AI model improvement through access to diverse data from participating countries.

2.2[a][iii] Data Protection

The prominence of data protection disciplines has grown with the expansion of digital trade, leading to stronger data protection commitments in recent RTAs.[32] These agreements, like the USMCA, ASDEA, and KSDPA, often include extensive digital trade provisions and reference international standards such as the Asia-Pacific Economic Cooperation (APEC) Cross-Border Privacy Rules (CBPR) and the OECD Guidelines on Privacy and Trans-border Flows of Personal Data. By referencing these international principles, RTA signatories aim to foster a comprehensive and unified framework to address data protection issues. Notably, dedicated digital trade agreements such as the DEPA outline essential data protection principles like data collection limits, user consent, and data security, which are crucial for addressing the ethical and privacy concerns inherent in data-driven technologies.

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[30] *See* Art. 14.13(3) in CPTPP, Art. 4.4(3) in DEPA, Art. 24(3) in ASDEA, Art. 8.61-G(3)(a) and (b) in UKSDEA, and Art. 14.15(3) in KSDPA. Additionally, Art. 12.14(3)(b) in RCEP includes national security exceptions.

[31] *See* e.g., in Art. 12 in USJDTA and Art. 19.12 in USMCA.

[32] *See* Art. 19.8(5) in USMCA, Art. 17.2 in ASDEA, and Art. 14.17(8) in KSDPA.

These RTAs incorporate key data protection principles that are crucial for responsible data use in AI systems. They also highlight the importance of data security and integrity by mandating measures against unauthorized access and data breaches. These disciplines ensure governance that oversees the ethical and legal aspects data usage in AI systems.

2.2[a][iv] New Data Issues

There are emerging data issues that could potentially affect AI development, typically involving open data and data innovation. Notably, recent RTAs address these new data issues through non-binding language advocating for best-endeavour commitments.

Firstly, disciplines on open data, commonly referred to as 'open government data' in RTAs, mandate accessible and non-proprietary central government information to foster cooperation and expand data access.[33] These agreements typically highlight the need for machine-readable, open formats for public information,[34] emphasizing spatial enablement and timely updates with APIs.[35] The synergy between open government data and AI development is mutually beneficial. Open data fuels AI by providing large, diverse, and real-world datasets necessary for algorithm training and informed decision-making, while AI technologies enhance the analysis and utilization of open data, enhancing efficiency and value of data analysis.

Secondly, the Australia-Hong Kong FTA, concluded in 2019, prominently addressed data innovation disciplines for the first time. Subsequently, similar provisions on data innovation have been included in nine other RTAs.[36] These agreements recognize the significance of cross-border data flows and data sharing for data-driven innovation. They propose collaboration through regulatory data sandboxes where data is shared amongst businesses in accordance with the Parties' respective laws and regulations.[37] Notably, the DEPA and the UKSDEA propose trusted data sharing frameworks under which independent, trusted third parties safeguard the data, and multiple parties, including AI-enabled companies, can access the data via secure data-sharing platforms.

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[33] Example, Art. 19.18 in USMCA and Art. 20 in USJDTA.
[34] *See* Art. 19.18(2) in USMCA and Art. 20(2) in USJDTA.
[35] *See* Art. 27(2)(b) in ASDEA, Art. 8.61-H(2)(b) in UKSDEA, and Art. 14.26(2)(b) in KSDPA.
[36] These RTAs pertain to the digital economy, including the DEPA, the ASDEA, the UKSDEA, the KSDPA and Latin American-led agreements, such as the Chile-Paraguay FTA and the China-Ecuador FTA.
[37] *See* Art. 9.4 in DEPA, Art. 26 in ASDEA, Art. 8.61-I in UKSDEA, and Art. 14.25 in KSDPA.

2.2[b] *Digital Cooperation*

Provisions on digital cooperation en digital inclusion, cooperation, and capacity building.

2.2[b][i] Digital Inclusion

The significance of digital inclusion lies in ensuring equitable access to the benefits of the digital economy. It emphasizes enabling access to innovations and new technologies to spur economic growth, particularly benefiting small and medium sized enterprises (SMEs) and vulnerable socioeconomic groups.[38] The UKSDEA enhances its focus on digital inclusion by addressing key aspects such as labour protection, digital skills development, and accessibility to online business tools in digital trade. It also aims to bridge the digital divide among countries, endorsing 'the role for digital trade in promoting economic development and poverty reduction'.[39] Additionally, the UKSDEA advocates proactive participation in capacity-building initiatives within international forums such as the World Trade Organization (WTO) to promote digital inclusion.

2.2[b][ii] Cooperation

Recent RTAs concluded in the late 2010s feature provisions aimed at enhancing cooperation. The USMCA promotes information sharing on regulations and best practices concerning personal data protection, security, authentication and government use of digital tools. This highlights the importance of joint efforts towards compatible privacy regimes, as illustrated by mechanisms such as the APEC CBPR. Other DEAs offer an expanded framework for cooperation. Specifically, the UKSDEA stands out for comprehensive provisions on information exchange and best regulatory practices in the digital economy, with a specific focus on addressing AI within its cooperation provisions.[40]

2.2[b][iii] Capacity Building

The ASDEA stands out for its specific capacity-building provision. This provision fosters cooperation among countries and within the region in pivotal areas of digital trade such as digital connectivity, support for SMEs, data protection, and

[38] *See* Art. 11.1 in DEPA and Art. 8.61-P in UKSDEA.
[39] *See* Art. 8.61-P(4) in UKSDEA.
[40] *See* Art. 8.61-W(2)(a)(x) in UKSDEA.

cross-border data flows. This underscores a dedication to narrow regional barriers and bridging the digital divide.[41]

3 DIVERSE REGULATORY APPROACHES OF ECONOMIES: EXAMPLES OF THE US, EU, CHINA AND SINGAPORE

Although recent RTAs share common objectives to facilitate AI development and regulate AI within well-defined frameworks, the unprecedented challenges of AI in terms of scale and complexity have triggered diverse domestic regulatory responses across economies. This section will analyse the domestic AI regulatory approaches of four leading economies in the AI field – the US, EU, China, and Singapore. These analyses may have important implications for these economies' roles in regional AI governance.

3.1 The US approach

The US's regulatory approach to AI is characterized by a market-driven principle, aiming to sustain and enhance the country's scientific, technological, and economic leadership in the AI field. In 2019, the White House issued Executive Order 'Maintaining American Leadership in Artificial Intelligence',[42] launching a comprehensive national AI initiative.[43] This initiative outlines five key areas: (1) Investing in AI research and development; (2) Unleashing AI resources; (3) Setting AI governance standards; (4) Building the AI workforce; and (5) International engagement and protecting the US's AI advantage.

Following this initiative, in January 2020, the White House proposed AI regulatory principles, aimed at fostering innovation and limiting regulatory over-reach. These principles advocate for performance-based, flexible regulatory approaches that can adapt to rapid changes and updates to AI, as opposed to rigid, design-based regulations that could inhibit innovation by attempting to prescribe the technical specifications of AI. By providing technical guidance on AI rulemaking, these principles aim to reduce regulatory uncertainty that could hinder private sector innovation and development of AI technologies. Under such flexible regulatory frameworks, the US government's role focuses on funding AI

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41 *See* Art. 17 in ASDEA.

42 The White House. Executive Ord. 13859, *Maintaining American Leadership in Artificial Intelligence*. Federal Register (2019), https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence (accessed 21 Nov. 2023).

43 The White House, *Accelerating America's Leadership in Artificial Intelligence* (2019), https://trumpwhitehouse.archives.gov/articles/accelerating-americas-leadership-in-artificial-intelligence/ (accessed 6 May 2024).

research, facilitating technical standards, and fostering collaboration among industry, academia, and related government agencies, thereby nurturing a favourable AI ecosystem.

Concerning societal risks posed by AI, the US government has issued several policy documents that offer guidance for AI applications. For instance, in 2021, the National Institute for Standards and Technology (NIST) released a voluntary AI Risk Management Framework (RMF).[44] Since the release of OpenAI's ChatGPT, the Biden administration has accelerated AI policy-making via federal agencies and executive power. In 2023, the Executive Order on Safe, Secure and Trustworthy AI[45] was issued, setting new standards for AI development and application. Additionally, the White House released a Blueprint for an AI Bill of Rights,[46] guiding the design, use and deployment of AI systems to protect the American public. This Blueprint complements the Voluntary Commitments[47] signed by leading AI companies, such as Amazon, Microsoft and OpenAI,[48] which encourage social responsibilities and fill gaps in laws and regulations.

The US's market-driven and flexible regulatory approach to AI could have a remarkable impact on shaping international AI governance, particularly in terms of market access and rulemaking. On the one hand, the US is well-positioned in the AI innovation and market, given the predominance of US-based cloud computing and software service providers with commercialized AI access,[49] and a rich AI ecosystem with robust technological infrastructure and leading research institutions. Therefore, promoting an international environment that supports American AI research and innovation and opens market for American AI industries is definitely a focus of the US in negotiating trade pacts. On the other hand, the US can leverage its extensive experience in drafting digital trade disciplines[50] in

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44 NIST, *Artificial Intelligence Risk Management Framework*, Federal Register (2021), https://www.federalregister.gov/documents/2021/07/29/2021-16176/artificial-intelligence-risk-management-framework (accessed 3 Feb. 2024).

45 The White House, WHAT THEY ARE SAYING: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence (2023), https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/31/what-they-are-saying-president-biden-issues-executive-order-on-safe-secure-and-trustworthy-artificial-intelligence/ (accessed 18 Feb. 2024).

46 The White House, *Blueprint for an AI Bill of Rights* (2023), https://www.whitehouse.gov/ostp/ai-bill-of-rights/ (accessed 18 Feb. 2024).

47 The White House, FACT SHEET: Biden-Harris Administration Secures Voluntary Commitments from Leading Artificial Intelligence Companies to Manage the Risks Posed by AI (2023), https://www.whitehouse.gov/briefing-room/statements-releases/2023/07/21/fact-sheet-biden-harris-administration-secures-voluntary-commitments-from-leading-artificial-intelligence-companies-to-manage-the-risks-posed-by-ai/ (accessed 20 Feb. 2024).

48 *Ibid*. *See also* the New York city's AI Hiring Regulations enforced in Jul. 2023.

49 Daniel Imber, *The Latest Cloud Computing Statistics* (updated Jan. 2024). AAG IT Services (5 Jan. 2024), https://aag-it.com/the-latest-cloud-computing-statistics/ (accessed 13 Feb. 2024).

50 In total, the US has entered into fifteen RTAs that contain digital trade chapters and are currently in force. This calculation is based on the authors' observation from TAPED dataset as of Nov. 2023.

negotiating new RTAs with AI provisions. Notably, the US-Mexico-Canada Agreement (USMCA) and the US-Japan Digital Trade Agreement (USJDTA) are considered comprehensive and high-standard agreements addressing digital trade issues.[51] Although, as of the time of writing, the US has not yet participated in RTAs with AI-specific provisions, these existing agreements already include favourable arrangements that foster data pooling for AI development without data localization requirements. Additionally, the US is currently an active participant in other AI governance-related international forums beyond RTAs.[52]

However, it may be premature to conclude that the US will follow a completely market-driven path towards AI regulation on the international stage. The intricate connections between AI regulation, national security and geopolitical considerations suggest a more complex scenario. A recent policy shift in the US may indicate a different approach. Specifically, the US has paused negotiations on new RTAs, and has retracted its support for free cross-border data flows, the prohibition of data localization requirements, and the prohibition of software source code reviews in the e-commerce negotiations at the WTO. Furthermore, the US has suspended negotiations on critical digital trade issues within the Indo-Pacific Economic Framework for Prosperity.[53] These shifts in position are driven by domestic policy motives to reinforce regulations on Big Tech companies and concerns about geo-strategic competition with other leading AI economies, promoting a re-evaluation of trade rulemaking strategies, particularly in sensitive areas such as data and source code.[54]

3.2 The EU approach

The EU distinguishes itself from the US by taking a regulatory-driven approach to AI, which involves a comprehensive legislative framework for AI. At the heart of this framework lies the EU AI Act, which is a pioneering piece of legislation that sets out the world's first comprehensive legal framework for AI regulation.[55] The AI Act

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[51] USTR, *FACT SHEET on U.S.-Japan Digital Trade Agreement* (Oct. 2019). https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2019/october/fact-sheet-us-japan-digital-trade-agreement (accessed Oct. 2023).

[52] Example, the US-UK Atlantic Declaration and the Bletchley Declaration.

[53] David Lawder, *US Drops Digital Trade Demands at WTO to Allow Room for Stronger Tech Regulation*, Reuters (26 Oct. 2023a), https://www.reuters.com/world/us/us-drops-digital-trade-demands-wto-allow-room-stronger-tech-regulation-2023-10-25/ (accessed 18 Feb. 2024). David Lawder, *US Suspends Indo-Pacific Talks on Key Aspects of Digital Trade-Lawmakers*, Reuters (9 Nov. 2023b), https://www.reuters.com/business/finance/us-suspends-indo-pacific-talks-key-aspects-digital-trade-lawmakers-2023-11-08/ (accessed 24 Feb. 2024).

[54] Javier Ruiz & Maria Sovana, *The US Turn is Reshaping the Geopolitics of Digital Trade. What Does This Mean for the UK?* CITP (5 Dec. 2023), https://citp.ac.uk/publications/the-us-turn-is-reshaping-the-geopolitics-of-digital-trade-what-does-this-mean-for-the-uk (accessed 26 Feb. 2024).

[55] European Parliament legislative resolution of 13 Mar. 2024 on the proposal for a regulation of the European Parliament and of the Council on laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts (COM

adopts a horizontal strategy, covering the entire AI lifecycle across all sectors and industries. This approach allows AI regulations to adapt to the dynamic nature of AI development while safeguarding the fundamental rights of citizens across the board. A key feature of the EU AI Act is its risk-based categorization of AI applications. These applications are divided into four risk levels: unacceptable risk (prohibited by the AI Act), high risk (subject to strict regulation),[56] limited risk (with fewer requirements) and minimal to no risk.[57] This categorization imposes clear compliance obligations based on the potential risks and impacts of each AI application. EU citizens have the right to launch complaints and receive meaningful explanations for AI applications that jeopardize fundamental rights. Additionally, substantial administrative penalties are in place for non-compliance with the AI Act's requirements.

At the regional level, the EU has been incorporating digital trade-related provisions into its trade agreements since the early 2000s.[58] Recent agreements, such as the EU–UK Trade and Cooperation Agreement and the EU-New Zealand Free Trade Agreement, have expanded the scope and binding nature of digital trade disciplines. In addition to RTAs, the EU has been negotiating stand-alone 'digital partnerships' with countries in the Asia-Pacific region.[59] These partnerships address a broader range of digital trade issues, including data governance and AI, but they are built on a soft law approach aimed at facilitating process-driven tools rather than enforcing obligatory commitments.

The EU's domestic AI regulations and regional digital trade rulemaking reflect its stance on international AI governance. The EU prioritizes data security and individual privacy, which is evident in regulations such as the General Data Protection Regulation (GDPR) and Data Governance Act. These regulations underscore the EU's commitment to safeguarding its citizens in the face of potential risks of cross-border data transfers. The EU's meticulous approach to data privacy has influenced its trade agreements, with a majority refraining from committing to unrestricted data flows and open government data to protect citizens' privacy rights.[60]

(2021)0206 – C9-0146/2021 – 2021/0106(COD)) (europa.eu) (13 Mar. 2024), https://www.europarl.europa.eu/doceo/document/TA-9-2024-0138_EN.pdf (accessed 20 Mar. 2024).

[56] Examples of high-risk AI uses include critical infrastructure, education and vocational training, employment, essential private and public services (e.g., healthcare, banking), certain systems in law enforcement, migration and border management, justice and democratic processes (e.g., influencing elections).

[57] European Commission, *Coordinated Plan on Artificial Intelligence* (1 Mar. 2024), https://digital-strategy.ec.europa.eu/en/policies/plan-ai (accessed 20 Mar. 2024).

[58] Currently, the EU has a total of twenty-four RTAs that include provisions for digital trade and fifteen of which consist of digital trade dedicated chapters. This calculation is based on the authors' observation from TAPED dataset as of Nov. 2023.

[59] Nicolas Köhler-Suzuki, *Mapping the EU's Digital Trade. A Global Leader Hidden in Plain Sight?* Policy paper, Paris: Jacques Delors Institute (Jul. 2023), https://institutdelors.eu/en/publications/mapping-the-eus-digital-trade/ (accessed 5 Jan. 2024).

[60] While the data localization provisions are not entirely excluded in the EU-Colombia-Ecuador-Peru Trade Agreement and other agreements with Mexico and Japan, the commitments in these agreements are non-binding.

In terms of balancing regulation and innovation in AI, the EU is facing challenges. Compared to the US, the EU lags behind in AI innovation and industry development, due to insufficient funding, an incomplete EU single market, a shortage of domestic talent, and limited data flows.[61] While the EU leans towards regulating AI rather than liberalizing it to stimulate development, this approach poses obstacles, particularly for AI innovations that are versatile and challenging to predict. When exporting its stringent AI regulations and values to trade partners, the EU must navigate the contrasting approaches seen in the domestic AI Act's firm commitments and the regional digital partnerships' softer, process-driven tools. By experimenting with these two approaches, the EU can refine its AI regulation strategies.

3.3 The China approach

China's approach to AI regulation is distinctly geared towards bolstering its data-driven economy. With the implementation of the 'Data Element X' initiative,[62] China aims to build a digital economy where data serves as a key element. Among the tasks identified by this initiative, a focus is the creation and enhancement of large AI models facilitated by access to high-quality data pools. Additionally, China has released two specific policy documents on AI. One is the 'New Generation Artificial Intelligence Development Plan' (AIDP) released in 2017, which outlines strategic objectives and major tasks for AI innovation, deployment, industrial application, and integration into social services.[63] This plan highlights AI's potential to drive economic and social advancement while emphasizing the necessity for its development to be safe, reliable, and manageable. The other is the 'Ethics Code for the Next Generation of Artificial Intelligence' released in 2021, aiming to integrate ethics and morals into the full lifecycle of AI. Specifically, it puts forward six basic ethical requirements, including promoting human well-being, promoting fairness and justice, protecting privacy and security, ensuring controllability and credibility, strengthening accountability, and improving ethical quality.[64]

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[61] *See* Niccolò Bianchini & Lorenzo Ancona, *Artificial Intelligence: Europe Needs to Start Dreaming Again*, Foundation Robert Schuman No. 728 (Nov. 2023), https://www.robert-schuman.eu/en/european-issues/728-artificial-intelligence-europe-needs-to-start-dreaming-again (accessed 5 Jan. 2024).

[62] 中央网络安全和信息化委员会办公室. '数据要素×' 三年行动计划 (2024—2026年) (2023), http://www.cac.gov.cn/2024-01/05/c_1706119078060945.htm (accessed 10 Mar. 2024).

[63] 中国政府网. 新一代人工智能发展规划 (2017), https://www.gov.cn/gongbao/content/2017/content_5216427.htm?eqid=e144cbdc00000c75000000066466e8ac (accessed 10 Mar. 2024).

[64] 中国科技部. 《新一代人工智能伦理规范》(2021), https://www.most.gov.cn/kjbgz/202109/t20210926_177063.html (accessed 10 Mar. 2024).

At the practical level, in response to the rapid growth of AI innovation and deployment in China,[65] the Cyberspace Administration of China (CAC), in collaboration with other government authorities, has introduced an interim regulatory framework in 2023 to govern generative AI services (CAC, 2023).[66] This framework aligns with China's AI regulatory ethos, delineating the supervision, inspection and legal responsibility mechanisms for AI services.

Expanding beyond domestic AI regulations, China's participation in digital trade agreements has evolved incrementally over time. Initially, China primarily focused on adhering to WTO rules and the non-binding technical provisions within e-commerce commitments.[67] Since late 2000s, China has participated in a limited number of trade agreements that address digital trade issues, often committing to less stringent terms than those found in other e-commerce agreements signed in the same period.[68] More recently, China has shown an increased interest in joining RTAs that focus more on digital trade, as evidenced by its participation in the RCEP and application to join the DEPA. Concurrently, China has advocated for international cooperation on AI issues. At the fifteenth Brazil, Russia, India, China and South Africa (BRICS) Summit in 2023, China and other BRICS countries agreed to launch a study group on AI at an early date, further expanding cooperation on AI and stepping up information exchanges and technological cooperation. Recognizing that AI is a new area of development, which can bring huge development dividends yet also contains risks and challenges, China has called for the promotion of the establishment of an international mechanism for universal participation, and for the development of AI governance frameworks and standards with broad-based consensus. This is intended to continuously make AI technologies more secure, reliable, controllable and equitable.[69] China's more active role in regional digital rulemaking and AI cooperation showcases its willingness to embrace digital trade and AI development while balancing technology-driven economic potential and security-based

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[65] Currently, China's AI sector is experiencing a rapid growth, surpassing the US in terms of AI research. *See* Ashwin Acharya & Brian Dunn, *Comparing US and Chinese Contributions to High-Impact AI Research*, Centre for Security and Emerging Technology (9 Jun. 2023), https://cset.georgetown.edu/publication/comparing-u-s-and-chinese-contributions-to-high-impact-ai-research/ (accessed 9 Jan. 2024), Jiangjiang Yang & Oren Etzioni, *China is Closing in on the US in AI Research*, AI2 Blog. Medium (6 Jan. 2022) https://medium.com/ai2-blog/china-is-closing-in-on-the-us-in-ai-research-ea5213ae80df (accessed 10 Jan. 2024).

[66] 中华人民共和国国家互联网信息办公室. 生成式人工智能服务管理暂行办法 (2023), http://www.cac.gov.cn/2023-07/13/c_1690898327029107.htm (accessed 10 Mar. 2024).

[67] Nigel Cory & Luke Dascoli, *How Barriers to Cross-Border Data Flows are Spreading Globally, What They Cost, and How to Address Them*. ITIF (Jul. 2021) https://itif.org/publications/2021/07/19/how-barriers-cross-border-data-flows-are-spreading-globally-what-they-cost/ (accessed 8 Oct. 2023).

[68] *See* e.g., Art. 12.1 in China's FTA with Australia has addressed digital trade (e-commerce) in a best endeavour language that the parties should try to ensure that trade through e-commerce should not be more restricted than traditional form of trade.

[69] China Daily, *Xi Urges BRICS to Expand Political*, Security Cooperation for Peace, Tranquility (2023), https://www.chinadaily.com.cn/a/202308/23/WS64e5d879a31035260b81dd1c.html (accessed 10 Jan. 2024).

national interests. It can be expected that China will become more active in global AI governance, given its massive market potential and its learning-by-doing regulatory efforts.

3.4 The Singapore approach

Singapore's approach to AI regulation integrates strategic foresight with a pragmatic focus, aiming to maximize the transformative impact of AI across business, government and societal sectors. This approach underlines a unique trajectory in AI governance, with a emphasis on AI enablement through collaborative efforts among multiple stakeholders. The release of the National AI strategy (NAIS 1.0) in 2019, followed by the NAIS 2.0 in 2023, underscores Singapore's vision to create an AI-friendly environment and to become a leading global hub for AI innovation and deployment.[70] Singapore's 'light touch' regulatory philosophy is exemplified through voluntary frameworks that concentrate on facilitating practical tools and initiatives aimed at fostering responsible and trustworthy AI. Key initiatives such as the Model Governance Framework, the Implementation and Self-Assessment Guide for Organizations (ISAGO), and the Compendium of Use Cases embody this approach.[71]

In addition to its national AI initiatives, Singapore's proactive involvement in developing DEAs represents pioneering efforts in international digital trade rulemaking. By prioritizing DEAs, Singapore aims to develop international frameworks that enhance interoperability of standards and systems and support businesses, especially SMEs, in digital trade. The Singapore-led DEAs not only facilitate cross-border data flows while safeguarding personal data and consumer rights, but also promotes collaboration among economic partners in nascent areas such as digital identities, AI and data innovation.[72]

Singapore's expertise in drafting DEAs enhances its influence in regional AI rulemaking, characterized by a dynamic and inclusive approach. Notably, the DEPA stands out for its flexible and innovative approach, allowing signatories to introduce new issues through a joint committee mechanism.[73] This adaptability

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[70] Cristiano Peswani, *National Artificial Intelligence Strategy 2.0 to Uplift Singapore's Social and Economic Potential*, SG Press Centre (4 Dec. 2023), https://www.sgpc.gov.sg/detail?url=/media_releases/sndgo/press_release/P-20231204-2&page=/detail&HomePage=home (accessed 10 Jan. 2024).

[71] Personal Data Protection Commission, *Model AI Governance Framework (Second Edition)* (Jan. 2020), https://www.pdpc.gov.sg/help-and-resources/2020/01/second-edition-of-model-artificial-intelligence-governance-framework (accessed 6 Oct. 2023). Smart Nation and Digital Government Office, *National AI Strategy*, Smart Nation (2023), https://www.smartnation.gov.sg/nais/ (accessed 3 Feb. 2024).

[72] Ministry of Trade and Industry, *Digital Economy Agreements* (2024), https://www.mti.gov.sg/Trade/Digital-Economy-Agreements (accessed 5 Apr. 2024).

[73] *See* Art. 12.2 in DEPA.

supports addressing evolving digital trade challenges, particularly in cutting-edge technologies like AI. Concurrently, Singapore's active engagement in international fora related to AI positions it as a thought leader in global AI governance. Its unique position, sharing characteristics with both leading digital economies like the US and the EU in terms of technological readiness, as well as the varied landscapes of Asian countries and developing economies, provides Singapore with a nuanced understanding of negotiation diversity. This was evident at the fourth ASEAN Digital Ministers' Meeting, where Singapore's 'Building an Inclusive and Trusted Digital Ecosystem' declaration was adopted, incorporating guidelines on AI Governance and Ethics.[74] This declaration led to the establishment of an ASEAN Working Group aimed at developing shared regional standards. By offering flexible and inclusive approach for AI implementation, Singapore aims to establish common AI principles benefiting countries at different digital development stages. Singapore's effort in fostering region-wide AI standards and promoting digital trade partnerships with developing nations sets a model aligning with diverse AI governance needs across different economies.

3.5 Key features in current landscape of AI regulatory approaches

The AI regulatory landscape across four key economies showcases distinct approaches reflecting their strategic priorities, societal values, and technological capabilities. These differences can be classified along several axes: non-binding versus binding commitments, regionalism versus domestication, market-driven versus regulatory-driven rulemaking, and geopolitical concerns versus international cooperation. Such diversities present a fragmented regulatory landscape of AI while economies are navigating the mix of opportunities and challenges along the way.

(1) Non-binding versus Binding Commitments: The US and Singapore have embraced a lenient stance on AI regulation, focusing on non-binding norms, standards and best practices. This approach facilitates AI innovation and development by encouraging voluntary commitments on AI among businesses, along with broader international cooperation beyond traditional trade rules. In contrast, the EU and China have implemented more rigid regulatory AI frameworks. The EU, through firm commitments in the AI Act, is attempting to exert itself as a regulatory superpower in the evolution of AI. Similarly, China has put in place a robust legal framework for generative AI services, which underscores legal

[74] The ASEAN Secretariat, *Singapore Declaration – Building an Inclusive and Trusted Digital Ecosystem* (2024), https://asean.org/singapore-declaration-building-an-inclusive-and-trusted-digital-ecosystem/ (accessed 5 May 2024).

measures in response to perceived uncertainties and risks associated with AI technology.

(2) Regionalism versus Domestication: The US, the EU, and Singapore focus on projecting their AI regulatory frameworks at both domestic and regional levels, leveraging their experience in drafting digital trade agreements to influence global AI rulemaking. The EU is unsurprisingly leading in this regard, trying to position itself as a regulatory leader in the AI field and replicate the 'Brussels effect' of its data privacy rules which had significant global impact. Comparatively, China prioritizes establishing a robust domestic framework to govern AI development and its integration into the national economy. This focus on internal rulemaking aligns with China's broader strategy to become a leader in AI technology by closely controlling how AI is developed, used, and managed within the country. Conversely, when it comes to negotiating international digital trade agreements that include comprehensive digital trade provisions, China has shown less engagement and experience. This disparity can be attributed to China's focus on domestic priorities and ongoing development of nuanced understanding and strategies to handle the technical and legal complexities involved in these international agreements.

(3) Market-driven Rulemaking versus Regulatory-driven Rulemaking: Market-driven rulemaking, which emphasizes flexibility and policy space for technological advancements, is seen as a strategic pathway to boost a nation's AI innovation and competitive advantage. This approach stands in contrast to regulatory-driven rulemaking, which places a stronger emphasis on addressing AI challenges through comprehensive regulations. All four key economies recognize the importance of balancing development and security to ensure the development of the AI sector is safe, secure, and trustworthy. While the US and Singapore lean towards market-driven rulemaking, the EU tends to favour regulatory-driven rulemaking on a horizontal basis. China, driven by its massive market potential and concerns about data security, relies on a hybrid approach that utilizes industry self-discipline and targeted secondary legislation.

(4) Geopolitical Concerns versus International Cooperation: The strategic importance of AI for competition and security has prompted nations to enact policies with geopolitical considerations. Factors such as threat perceptions, levels of trust, and alignment of interests among nations can significantly shape the nature and extent of international cooperation in the AI field. Among the leading AI nations, including the US, EU, China and Singapore, the geopolitical concerns have formed a major obstacle for broader international cooperation. The US is well-positioned across most of the building blocks of AI, such as computing power, talent and data, and leverages its AI strategies as a tool in its competitive dynamics with China. Concerns over China's potential gains in AI capabilities

have led the US to implement a series of protectionist measures. Export controls already block the transfer of vital US semiconductor technology to China, while outbound investment rules aim to stem the flow of US capital and knowledge to Chinese AI companies. The outsized role of US companies in spreading access to AI across sectors also presents a challenge for the EU, exacerbating concerns on Europe's over-dependence on large US technology platforms. In response, the EU has embarked on a course of action aimed at achieving 'digital sovereignty', seeking to fortify domestic hardware and software capacities while reducing dependence on external technologies.[75] While the EU and China may find common ground in certain aspects of AI regulation, such as data privacy protection, underlying trust issues could emerge stemming from apprehensions related to data security and misuse, especially concerning surveillance applications powered by AI technology. These geopolitical tensions challenge the creation of common ground among leading AI nations, impeding global AI benefit exploration and governance coordination. Addressing these complexities is essential for effective international collaboration and maximizing AI potential.

4 PROSPECT OF AI GOVERNANCE AT THE REGIONAL LEVEL: ROLE OF RTAS

The cross-border impact of AI development requires governance efforts at the intergovernmental level. Beyond varied domestic regulatory frameworks, RTAs can play a crucial role in international efforts to foster regional cooperation on AI and improve interoperability among diverse governmental approaches to AI. Despite concerns from digital rights advocates that an over-reliance on trade agreements for AI governance could overshadow critical policy objectives such as user privacy, digital security, and prevention of algorithmic discrimination,[76] separating AI governance from trade regulations may be impractical in today's interconnected world of digital trade. In this context, the following section discusses the strengths and limitations of current RTAs in AI governance, and offers recommendations for enhancing AI-specific commitments within these agreements.

4.1 Strengths and limitations of RTAs in AI governace

RTAs play a vital role in global AI governance by meeting AI-related trade challenges. RTAs can incorporate provisions that harmonize AI standards,

[75] Huw Roberts, Emmie Hine, Mariarosaria Taddeo & Luciano Floridi, *Global AI Governance: Barriers and Pathways Forward*, 100(3) Int'l Affairs 1275–1286 (2024), doi: 10.1093/ia/iiae073.

[76] Emily Jones, *Digital Disruption: Artificial Intelligence and International Trade Policy*, 39(1) Oxford Rev. Econ. Pol'y 70–84 (2023), doi: 10.1093/oxrep/grac049.

promote ethical AI practices, foster AI innovation and collaboration, support capacity building and inclusiveness, and enable institutional adaptability to rapid technological shifts. They serve as platforms for knowledge exchange, providing opportunities for sharing best practices and establishing collaborative mechanisms. The diversity within RTAs allows for piloting various regulatory approaches, facilitating both strict and flexible policies, and evaluating the effectiveness of the AI regulations over time. RTAs could also be dynamic, and broaden over time by taking in new members or deepen in strengthening commitments. By allowing for flexible combinations of countries, RTAs can serve as experimental fields for future dialogues among the WTO membership.

However, the limitation of addressing AI governance within RTAs lies within their inherent trade-focused nature and confined scope, which may lead to limited consideration on broad societal and ethical AI issues, potentially failing to provide comprehensive regulations needed to address AI governance. RTAs often prioritize economic interests and seek regulatory harmonization among Member States. This focus may result in compromises when crafting comprehensive regulatory frameworks capable of addressing the intricate AI challenges, such as data privacy, algorithmic bias, and lack of transparency and accountability. In this respect, while RTAs play a role in shaping certain aspects of AI governance, they fall short of providing a complete solution for tackling the complex and dynamic AI challenges on a global scale.

4.2 Recommendations for strengthening AI commitments in RTAs

Updating trade agreements is crucial due to the inadequacy of existing international economic laws and cooperative frameworks in handling the opportunities and challenges posed by the digital age and frontier technologies like AI. The following recommendations outline areas in which RTA can strengthen commitments to tackle critical AI-relevant issues.

Elaborating AI provisions in existing RTAs. It is advisable to review and expand upon existing RTAs by adding standalone AI and AI-related digital chapters. The regional path is more pragmatic before creating a new multilateral framework on AI amid current geopolitical and competition concerns.

(1) Adopting a risk-based AI regulation approach. Incorporating a common risk-based approach to AI into RTAs, inspired by nations like the EU which have already developed their risk-based AI frameworks, can streamline AI management based on risk assessment. Several RTAs, like the UK-New Zealand FTA, have already embraced this regulatory approach. Further discussions are necessary to understand

the implications of AI regulation being risk-based, including the development of risk assessment and risk management tools that RTAs can create for signatories to adopt.

(2) Facilitating access to AI infrastructure. RTAs can support the development of AI by reducing trade barriers to AI infrastructure, including essential hardware, software, data networking resources, and services. The facilitation of access to essential infrastructure can be identified in standalone AI provision or technical cooperation provisions.

(3) Building TBT-like commitments to standardize AI regulations. AI commitments in RTAs can glean important insights from existing WTO Technical Barrier to Trade (TBT) commitments, particularly in fostering transparency through notification mechanisms, promoting consultation and dialogue among stakeholders, advocating for the harmonization of standards, and establishing dispute settlement mechanisms. Similar to TBT provisions, transparency in AI regulations can enhance trust and facilitate early dialogue to address concerns, and coordination of standards could ensure interoperability and ethical alignment across AI systems. Furthermore, incorporating mechanisms for consultation and dispute settlement can promote inclusive policymaking and mitigate conflicts in specific AI issues such as AI algorithm bias.

(4) Collaborating on data governance for AI. The DEAs have made an attempt to address AI-related data governance that could help mitigate risks associated with data use in AI models. For instance, existing DEAs have incorporated data privacy and personal data commitments based on data frameworks such as APEC CBPR and Data Free Flow with Trust (DFFT). Trade agreements could aim to facilitate sharing best practices regarding data use, data protection and data disclosure. This work would be beneficial for drafting new data rules relevant to AI, as it allows parties to deepen their understanding of the data requirements in existing AI systems.

(5) Strengthening collaboration with other international bodies. Commitments within RTAs to collaborate with other international organizations or initiatives like the G20 AI disciplines, OECD AI Policy Observatory, GPAI, the UN System Chief Executives Board and other international organizations representing key stakeholders including businesses, consumers, and civil society, can boost dialogue and cooperation on AI-related trade issues. RTAs should leverage these collaborations to integrate insights from AI-focused forums and standard-setting bodies into trade commitments and develop new ones as necessary.

5 CONCLUSIONS

The rapid advancement of AI technologies is expected to significantly impact global trade, business operations, and societal groups. While the benefits of AI adoption are substantial, it is essential to address the challenges and risks associated

with its deployment. In response, governments are striving to find a balance between permissiveness and restrictiveness towards AI.

In our article, we aim to track the recent development of AI-specific and AI-related data provisions in RTAs, and identify regulatory diversities among leading AI nations including the US, EU, China and Singapore. A comparative review of typical RTAs highlights discrepancies in the scope and depth of AI-related provisions, with the UKSDEA covering the most comprehensive AI-specific commitments. Additionally, different AI regulatory models found in the US, EU, China, and Singapore reflect diverse economic, political, and societal contexts, and cater to local needs in navigating the opportunities and challenges of AI. Notably, Singapore's emphasis on DEAs within the Asia-Pacific region reflects a unique form of AI governance, embodying the concept of 'new Asian regionalism'.[77] Singapore's efforts in DEAs offer a promising strategy to alleviate looming digital disparities arising from AI technologies. Singapore acknowledges the varying technical landscapes among nations, allowing flexibility for partner countries to establish mutual agreements concerning interoperability, compatibility, and mutual recognition of AI systems. This approach has the potential to harmonize divergent interests and address distinctive regional challenges effectively.

While trade agreements play a crucial role in reducing trade barriers, encouraging innovation, harmonizing standards, and facilitating capacity building, challenges remain in terms of AI governance. These challenges encompass diverse domestic interests and regulatory approaches, imbalanced power distribution within and cross countries, and the need to balance trade objectives with other policy priorities.

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[77] Julien Chaisse & Pasha L. Hsieh, *Rethinking Asia-Pacific Regionalism and New Economic Agreements*, 31(2) Asia P. L. Rev. 451–68 (2023), https://scholars.cityu.edu.hk/files/160496102/157866987.pdf, doi: 10.1080/10192557.2023.2216056. Pasha L. Hsieh, *Introduction: New Asian Regionalism as a Global Paradigm Shift*, in *New Asian Regionalism in International Economic Law* (Cambridge University Press 2021), https://ssrn.com/abstract=3863744.