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Comparative Analysis of Digital Trade Provisions: Challenges and Lessons for Singapore

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Digital trade is an emergent domain of international rule-making. The proliferation of digital trade raises questions about how to facilitate, leverage, and govern the digital interconnectedness of economies. The emergence of digital economy agreements designed as novel instruments to establish digital trade rules reflects the need for a governance framework that supports a rapidly transforming trade environment. However, variations in the specificity, depth, and breadth of digital trade provisions and the difficulty of harmonising domestic laws and regulations across countries pose challenges to digital trade rule-making. In order to identify potential avenues for deepening cooperation on digital trade, this paper conducts a comparative analysis of digital trade provisions across trade agreements since 2000. The analysis finds that the most prevalent provisions are related to intellectual property, data protection, and e-commerce, while the least common provisions include commitments on new data issues and more in-depth provisions on e-commerce. While Singapore has been a front-runner in the adoption of digital trade provisions, there is room for strengthening cooperation with regard to broad-based non-discriminatory provisions and exclusions. Tackling regulatory heterogeneity is central to the construction of a more coherent digital trade regime.

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1 Introduction

Digital trade is an emergent domain of international rule-making. Digital trade in goods and services has been growing more than twice as fast as physical global GDP and contributes to more than 15% of global GDP (World Economic Forum, 2022b). The proliferation of digital trade raises questions about how to facilitate, leverage, and govern the digital interconnectedness of economies. To address these challenges, digital economy agreements (DEAs) have been designed as novel instruments to establish digital trade rules and foster interoperability between two or more economies. The emergence of DEAs as a new type of trade policy instrument that focuses exclusively on facilitating digital trade reflects the need for a governance framework that supports a rapidly transforming trade environment. These “digital-only” agreements advance the trade agenda by focusing exclusively on digital trade-related matters, but also emerge in a dense landscape of global trade governance comprising preferential trade agreements (PTAs) and other international trade agreements that already include provisions related to digital trade.

Provisions relating to digital trade have emerged since the 2000s and have been increasingly included in PTAs in the last two decades. Digital trade provisions are obligations to facilitate digital trade, defined as trade in goods and services that are digitally ordered and/or digitally delivered (OECD, 2020). Digital trade provisions thus could either directly or indirectly regulate digital trade. This includes provisions that directly regulate electronic commerce (e-commerce) and data flows, as well as provisions that could have “any sort of impact on the conditions for digital trade” (Burri, Callo-Müller, & Kugler, 2022). E-commerce provisions were first introduced into the policy-making space of trade agreements by the Jordan-US Free Trade Agreement (FTA), which pioneered 29 such provisions. In 2000, only 10% of PTAs concluded that year contained e-commerce provisions. This increased to 85% of PTAs in 2022. Of 379 PTAs signed since 2000, 138 of them have e-commerce provisions and 106 of them have e-commerce chapters. To date, a total of 115 unique digital trade provisions have been incorporated across 223 agreements.

DEAs have been an avenue for the development of a new generation of digital trade provisions which make key advances in promoting international cooperation on issues related to the digital economy. DEAs may be stand-alone agreements but often build on or upgrade the digital trade or e-commerce chapters of existing PTAs. The world’s first DEA, the Digital Economy Partnership Agreement (DEPA) among Chile, New Zealand, and Singapore, was signed in 2020 and came into force in 2021. Other countries have either expressed interest in signing up for the DEPA or developing their own bilateral DEAs. Canada notified the DEPA parties of its interest in joining the agreement in December 2020, and Korea formally requested to join the DEPA in October 2021. China, too, formally applied to join in December 2021. After DEPA, the subsequent

DEA was concluded only two months later between Australia and Singapore. Similar agreements involving major economies like the United Kingdom and Korea followed in relatively quick succession in the next two years. The speed of uptake, or consideration, of DEAs attests to the demand by countries for a framework for governing digital trade. Relatively short periods of gestation for these negotiations also signal the promise of DEAs as both a trade policy instrument in itself and in its substantive contributions to rule-making in digital trade.

Singapore, as one of the initiators of DEAs, has pursued such agreements, among other avenues, to foster greater interoperability of standards and systems related to digital trade. To date, Singapore has concluded negotiations on four DEAs including DEPA. Ongoing negotiations with members of the European Free Trade Association on a digital economy pact, as well as with other trading partners like Vietnam on similar initiatives, reflect the importance of establishing rules on digital trade as a policy priority. Forging clear, consistent, and common rules on digital trade matters for countries for fostering an open and trustworthy digital environment for businesses and consumers, and also for tackling emerging challenges like rising digital protectionism (Aaronson, 2018; 2019).

In order to understand avenues for the advancement of digital trade governance, this paper conducts a comparative analysis of digital trade provisions across agreements over time. Building on the case of Singapore which has made significant inroads in digital trade governance with its proactive stance towards DEAs, this paper identifies the challenges of building a coherent digital trade regime and proposes ways for deepening cooperation on digital trade. The analysis utilises the Trade Agreements Provisions on Electronic-Commerce and Data (TAPED) dataset which codes provisions related to digital trade in 379 trade agreements since 2000. The dataset codes the extent of legalisation of provisions, distinguishing between ‘soft’ and ‘hard’ commitments, in the areas of e-commerce, data-dedicated provisions, intellectual property, and new data economy issues (Burri et al., 2022).^{1 2}

Table 1. Summary Statistics of Agreements

Total number of agreements	379
Preferential Trade Agreements and other trade agreements	373
Digital Economy Agreements/Digital Trade Agreements	6
Total number of parties	163

¹‘Soft’ or non-binding commitments are legal arrangements that are “weakened along one or more of the dimensions of obligation, precision, and delegation” whereas ‘hard’ or binding commitments are legally binding obligations that are precise (Abbott & Snidal, 2000, 422).

²The June 2022 version of the TAPED dataset was used.

A closer look at the breadth and depth of digital trade provisions across agreements over time yields several findings. The scope of digital trade provisions has expanded significantly in the last decade, going beyond digital trade facilitation to include commitments on issues related to data regulation and other nascent areas such as artificial intelligence and cryptography. The most prevalent provisions across agreements concern intellectual property protection, data protection, and e-commerce. Notably, exceptions in which specific measures related to digital trade are excluded from the agreement are also highly common across agreements. Some of the least replicated provisions revolve around new data issues including Legal Technology (Lawtech) and Financial Technology (Fintech) cooperation, digital inclusion, and digital identities as well as more in-depth e-commerce provisions related to source code and algorithms. Across the board, DEAs extend the depth of existing digital trade rules and also introduce novel provisions on digital trade. These findings suggest that although recent developments in digital trade governance, including the formation of DEAs, are welcome advancements, there remains more to be done. Even countries that have been proactive in advancing digital trade rules, such as Singapore, face difficult domestic policy choices and are constrained by broader inertia in the global economy towards deepening international cooperation on digital trade.

This paper proceeds to map the landscape of digital trade provisions by examining the origins and development of novel digital trade provisions in agreements. The paper then discusses the most prevalent and least common digital trade provisions across agreements. The subsequent section focuses on Singapore’s agreements and considers potential avenues for deepening cooperation on digital trade. The paper concludes with key takeaways for the future of digital trade governance.

2 Evolution of Digital Trade Rules

Provisions relating to digital trade have emerged since the 2000s but these have largely been limited to general provisions, market access, and e-commerce. The Jordan-US FTA made significant contributions to digital trade governance by pioneering not only the first but also as many as 29 new provisions that provided the foundation for the regulation of cross-border digital trade in trade agreements today. These provisions span a range of issues related to e-commerce, data protection, and intellectual property. By establishing a precedent for addressing digital trade in trade agreements, the Jordan-US FTA paved the way for the inclusion of these and other new provisions in successive trade agreements. Table A1 presents the novel provisions that have been introduced in trade agreements since the 2000s.

Subsequent incorporation of dedicated e-commerce chapters marked further progress in digital trade governance.³ The introduction of a specialised chapter on e-commerce offered a new model and set a new standard for addressing digital trade in trade agreements. The Australia-Singapore FTA that was signed and came into force in 2003 was the first agreement that included a dedicated e-commerce chapter. The chapter contained 45 digital trade provisions, of which 6 were novel provisions that pushed even further the regulation of digital trade. These included provisions on data protection according to domestic law, storage of electronic forms of works of copyright and related rights, and domain name protection.

More recently, the introduction of DEAs as agreements that focus exclusively on digital trade further facilitate cooperation on digital trade. In 2020, the Australia-Singapore DEA upgraded the Australia-Singapore FTA by replacing the existing e-commerce chapter with a new Digital Economy chapter. This model of upgrading commitments on digital trade is similarly replicated in other trade partnerships, such as in the Korea-Singapore Digital Partnership Agreement (DPA) which amends the e-commerce chapter alongside other related chapters of the Korea-Singapore FTA. To understand the symbiotic relationship between PTAs and DEAs, we calculate the correlation between agreements (see Table A2).⁴ We use a subset of agreements involving Singapore since Singapore is a signatory of every one of the existing DEAs signed and in force thus far.⁵ DEAs upgrade digital trade rules in existing PTAs but are also built on a foundation of a growing body of digital trade provisions that were founded in existing PTAs. As shown in Table A2, a low correlation between PTAs and DEAs involving the same parties (such as between the Australia-Singapore FTA and Australia-Singapore DEA which has a correlation score of only 0.24) provides evidence that the DEAs are advancing more comprehensive, specific, or highly legalised digital trade rules that go beyond what has already been agreed upon in existing PTAs.

Conversely, the high correlation between DEAs among different parties suggests that DEAs share similar digital trade provisions. For example, the correlation scores between the Australia-Singapore DEA and two subsequent DEAs, the UK-Singapore DEA and the Korea-Singapore DPA, are 0.70 and 0.74 respectively. Substantively, this is suggestive of the potential positive implications of DEAs for the coordination of digital trade rules among countries. This also suggests that prevailing understandings in scholarship

³For brevity, “e-commerce chapters” used in this paper refers to both e-commerce/digital trade chapters in PTAs.

⁴Polychoric correlation for categorical variables is used to calculate the correlation between agreements. The coefficient is between 0 and 1, where 0 indicates no relationship and 1 indicates a perfect relationship. The higher the correlation, the more the two variables are correlated. In this paper, the correlation is computed based on whether the same kind of provision is included in any two PTAs, and whether it is a ‘soft’ or ‘hard’ provision as defined in the TAPED dataset. The correlation was not computed based on the text (i.e. language used) of the PTAs.

⁵The MERCOSUR Agreement on Electronic Commerce was signed on April 29, 2021 between Argentina, Brazil, Paraguay, and Uruguay but is not yet in force.

about boilerplating in international agreements (Allee & Elsig, 2019; Peacock & Snidal, 2019), where PTA formation often relies on the replication of existing templates, also extend to the relationship between PTAs and DEAs, as well as between DEAs. Taken together, these indicate that DEAs set the stage for a more coordinated approach towards digital trade governance especially as countries continue to negotiate and sign more of these agreements.

3 Prevalence of Digital Trade Provisions

3.1 Most Prevalent Provisions

The evolution of PTAs has played a significant role in shaping digital trade rules. Innovations with regard to digital trade in PTAs reflect and enable the increasing use of PTAs by countries as a means to address emerging issues in digital trade. Examining the relative prevalence of digital trade provisions across PTAs offers insights into the priorities of countries and also challenges in digital trade governance. Digital trade provisions that are most frequently replicated across agreements are those concerning intellectual property protection, data protection, and e-commerce. Table 2 presents these most prevalent digital trade provisions across agreements.

3.1.1 Intellectual Property

The most highly replicated provisions are references to the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) as well as other multilateral agreements related to intellectual property which have a total of 179 and 136 references respectively. Other intellectual property-related provisions include explicit references to World Intellectual Property Organisation (WIPO) Internet treaties, specifically the WIPO Copyright Treaty (1996) and the WIPO Performances and Phonogram Treaty (1996). The WIPO Copyright Treaty deals with the protection of works and distribution, rental, and broader communication rights of their authors in the digital environment. The rights of performers and producers of phonograms are protected by the WIPO Performances and Phonogram Treaty. Approximately 84% of these intellectual property-related provisions are ‘hard’ commitments or “legally binding obligations which are precise (or can be made precise through adjudication or the issuance of detailed regulations) and that delegate authority for interpreting and implementing the law” (Abbott & Snidal, 2000, 421). Signatories are obligated to comply with the provision and non-compliance could be dealt with by the dispute settlement mechanism of the agreement.

3.1.2 Data Protection

Following intellectual property-related provisions, data protection provisions are the second most prevalent set of provisions. A total of 120 data protection provisions that involve protection of personal data or data privacy of any kind are included across all the agreements. There is considerable variation in the way this data is protected; parties may take different legal approaches to protect personal information, which could involve the adoption or maintenance of a legal framework in accordance with the domestic law of signatories or international standards. For example, the Japan-Singapore Economic Partnership Agreement (JSEPA) includes a data protection clause under the General Exceptions article that applies to its Trade in Services chapter. Article 69 of the JSEPA states that parties are not prevented from the adoption or enforcement of measures necessary for “the protection of the privacy of individuals in relation to the processing and dissemination of personal data and the protection of confidentiality of individual records and accounts”. This, alongside similar clauses that apply to the Investment and the Movement of Natural Persons chapters, is a binding obligation that requires that signatories undertake measures to enforce its domestic laws and regulations to protect personal information.

3.1.3 E-commerce

The next most prevalent set of provisions is e-commerce provisions which refer to general provisions on technological neutrality, transparency, and other broad principles, as well as more specific provisions on market access, most-favoured-nation (MFN) treatment, customs duties, electronic transaction framework, digital trade facilitation and logistics, electronic transaction framework, consumer protection, access to and use of the internet, source code, algorithms, and encryption, and cybersecurity. Across the 167 agreements that incorporate e-commerce provisions, the most common e-commerce provision concerns cooperation activities on information and communications technology (ICT), e-commerce or digital trade such as cooperation in research and training activities to enhance the development of e-commerce. This is followed by provisions related to the non-imposition of custom duties on electronic transmissions and digital products as well as various digital technologies central to electronic transaction and digital trade facilitation.

Table 2. Most Prevalent Digital Trade Provisions

Provisions	Soft	Hard	Total
Reference to TRIPS	28	151	179
Provisions about cooperation on ICT, e-commerce or digital trade	122	16	138
Reference to multilateral agreements related to intellectual property	39	92	131
Provisions on data protection	94	26	120
Specific security exceptions	0	112	112
Reference to WIPO Internet Treaties	12	93	105
Provision on the non-imposition of custom duties on electronic transmissions	0	104	104
Provisions on consumer protection	90	14	104
Provisions on electronic authentication, electronic signatures or digital certificates	73	27	100
Provisions on trade secrets, or similar/like protection of undisclosed information/protection of data	16	84	100
General exceptions explicitly applicable to e-commerce/digital trade and data	0	99	99
Services (and investment) market access and NT commitments for the telecommunications sector	0	95	95
Specific exclusions of measures related to e-commerce/digital trade	2	93	95
Provision on paperless trading	77	17	94
Provision on customs procedures automatisation or custom data exchange systems	70	23	93
Dispute settlement mechanism applies to e-commerce/digital trade provisions	7	85	92
Services (and investment) market access and NT commitments for the financial services sector	1	89	90
Provision on electronic transactions framework	73	12	85
Reference to the transfer of data or data flows in the financial services chapter/provisions	0	85	85
Provision on the free movement of data outside the dedicated e-commerce/digital trade chapter	6	75	81

Notes: ‘Soft’ provisions are non-binding or weakly legalised obligations and ‘hard’ provisions are legally binding obligations. ICT: Information and communication technology, NT: National treatment, TRIPS: World Trade Organisation Agreement on Trade-Related Aspects of Intellectual Property Rights, WIPO: World Intellectual Property Organisation.

3.2 Least Common Provisions

The least common provisions are those pertaining to issues that are only beginning to gain attention in the governance of digital trade. These provisions predominantly concern new data issues, such as digital inclusion as well as more in-depth provisions related to e-commerce. Table A3 presents the least common provisions across agreements.

3.2.1 Digital inclusion and other new data issues

Digital inclusion provisions aim to address the ‘digital divide’, which is the gap between those who have access to digital technologies and those who do not. Digital inclusion provisions can take many forms, such as commitments to promote affordable and accessible broadband infrastructure, support for e-government and e-commerce initiatives, and efforts to promote digital skills and literacy. Only the DEPA has an article on digital inclusion. Article 11.1 of the DEPA states that the Parties “acknowledge the importance of digital inclusion to ensure that all people and businesses have what they need to participate in, contribute to, and benefit from the digital economy”.

A shared commitment towards digital inclusion is significant because expanding universal access to the internet and other digital technologies plays a crucial role in social and economic inclusion. Digital inclusion is also central to closing the digital divide in the global economy, where disparity in digital readiness among economies limits their ability to participate in and capitalise on growing digital trade or be connected to the global economy (World Economic Forum, 2021). Improving digital inclusion involves building digital identification platforms or digital payment systems, which are fundamental to enabling individuals and businesses to connect to the global economy. This, in turn, potentially enhances productivity, for instance, by directly connecting producers, buyers, and end-users, increasing global supply chain resilience (Quayson, Bai, & Osei, 2020).

Other new data issues on which provisions are only emerging include digital identities, Fintech cooperation, and Artificial Intelligence, competition policy. Digital identity provisions are designed to facilitate secure and efficient cross-border digital transactions, reduce fraud and cybersecurity risks, and promote digital inclusion. These provisions typically aim to establish common frameworks and standards for digital identity systems, facilitate cross-border recognition of digital identities, and promote the protection of personal data and privacy. Recent DEAs, the Australia Singapore Digital Economy Agreement (ASDEA) and the DEPA, are the two examples containing provisions related to digital identities. Under Article 29 of the ASDEA, Australia and Singapore agree to “pursue the development of mechanisms to promote compatibility between their respective digital identity regimes”. The provision includes a commitment to develop “appropriate frameworks and common standards to foster technical interoperability be-

tween each Party’s implementation of digital identities” and “exchang[e] knowledge and expertise on best practices relating to digital identity policies and regulations, technical implementation and security standards, and the promotion of the use of digital identities”.

3.2.2 E-commerce

While e-commerce provisions constitute some of the most prevalent provisions, more specialised and demanding e-commerce provisions have not been replicated as frequently across agreements. These provisions pertain to issues on the access to and use of the internet (including interactive computer services, net neutrality, and international internet connection), source code, algorithms, and encryption, as well as electronic transaction (such as e-payments, electronic transfer records, and e-invoicing). Governing these issues thus involves complex technical, legal, and economic considerations that can be difficult to reconcile across different jurisdictions. These differences plausibly impede consensus among countries on how to incorporate clear and enforceable provisions in agreements.

These specialised e-commerce provisions are demanding commitments on the part of countries for several reasons. For one, these provisions apply to sensitive policy areas that are often subject to domestic laws and regulations. For instance, source code and algorithms are often proprietary information, the governance of which is likely to encounter pushback from businesses that consider these critical assets. Cryptography which is essential to the protection of data privacy and security is also complicated to regulate where governments are keen to have oversight and control over the use of encryption.

It is also challenging to coordinate existing domestic laws and regulations among countries. Take for example the principle of net neutrality that requires internet service providers to treat all internet traffic equally, without discriminating against certain types of content or services; the way in which net neutrality is implemented can vary across different countries, depending on their domestic regulatory frameworks and market structures. Besides, these legal frameworks are often underpinned by more fundamental normative principles towards the internet. Unlike the US which adopts a minimal net neutrality regulatory regime that emphasises only transparency obligations, the EU implemented an Open Internet Regulation in 2016 which enshrines a user’s right to be “free to access and distribute information and content, run applications and use services of their choice”.

Nonetheless, these forward-looking – while weakly binding – provisions are pivotal to the construction of next-generation digital trade rules. These provisions serve as a starting point for the incremental undertaking of further commitments and also provide a reference point for other countries seeking to cooperate on similar issues. Whereas

provisions that have a high prevalence in agreements reflect central issues in trade governance or issues on which consensus is more readily achieved, slow uptake of provisions may suggest delicate issues or issues upon which signatories exercise reservation precisely because of the absence of precedents to refer to. Broad or weak provisions guide the development of more concrete commitments, providing a blueprint that can be replicated and enhanced by other countries seeking similar undertakings. For instance, the frequent inclusion of clauses that specify the “exchange of knowledge and expertise on best practices” like in the DEPA further indicates continued cooperation on these issues.⁶ Substantively, the articulation of shared understandings affirms an underlying commitment to continued engagement on digital trade issues. Besides, weakly binding provisions in an agreement enable compromise which may instead accelerate further, harder legalisation (Abbott & Snidal, 2000). Negotiating parties are able to conclude agreements, moving forward on areas where consensus is reached while affirming commitment to other issues.

4 Singapore: Challenges and Lessons in Digital Trade Rule-making

4.1 Singapore: A Front-runner

Singapore is a signatory to the highest number of FTAs with novel digital trade provisions. Singapore participates in 12 such agreements, across which 47 new digital trade provisions have been introduced. Table 3 presents the top 25 signatories with the highest number of PTAs with novel provisions and highest total number of novel digital trade provisions across all their agreements. Singapore is also among the pioneering signatories of the first DEA, the DEPA, and is the country with the most number of DEAs signed to date. Continued efforts to forge bilateral agreements on the digital economy are underway, including an affirmation in 2021 to accelerate the work of its joint technical working group on Digital Partnership with Vietnam. Already, the precedent set by digital trade provisions related to data governance, digital trade facilitation (including paperless trading and e-invoicing) and the protection and enforcement of intellectual property that first appeared in agreements to which Singapore is a party has seen relatively widespread adoption by other agreements. Table A4 shows the diffusion of provisions that originated in Singapore’s agreements in other agreements.

Singapore’s engagement with digital trade rule-making efforts centres around both PTAs and digital trade-related initiatives at the World Trade Organisation (WTO). Singapore’s proactive stance towards DEAs, which have become pertinent to the de-

⁶DEPA Article 7.1 (Digital Identities). Similar clauses are included in modules on Digital Identities, Small and Medium Enterprises Cooperation, and Digital Inclusion, among others.

velopment of digital trade rules, is complemented by its role as the co-convenor of the WTO Joint Statement Initiative (JSI) on E-Commerce (alongside Australia and Japan). While scholarship finds that digital trade rule-making has shifted from the WTO to PTAs because of sluggish progress in the former realm, ratification of agreements related to digital trade provisions under the auspice of the WTO has positive spillover effects on the PTA agenda on digital trade (Elsig & Klotz, 2021). WTO-PTA linkage thus presents an opportunity for synergy in Singapore’s efforts towards advancing digital trade governance.

Table 3. Countries with the most number of novel provisions introduced across agreements

Signatory	Number of PTAs with Novel Provisions	Total Number of Novel Provisions
Singapore	12	47
US	8	45
Jordan	1	29
Australia	6	16
New Zealand	5	14
Japan	5	12
Chile	7	11
Canada	4	9
Peru	4	7
Mexico	4	7
Europe	4	6
Brunei	4	6
Costa Rica	1	5
Colombia	2	5
Vietnam	3	4
Malaysia	3	4
Cambodia	2	3
Philippines	2	3
UK	1	3
Korea	3	3
Laos	2	3
Thailand	2	3
Indonesia	2	3
Taiwan	1	2
Kyrgyzstan	2	2

Notes: Number of first-introduced provisions is the number of digital trade-related provisions first introduced by PTAs in which the member was a signatory. First-introduced digital trade-related provisions are selected based on the signing date. Source: Authors’ compilation from the TAPED dataset.

4.2 Challenges of Digital Trade Rule-making

While Singapore has been a front-runner in digital trade governance with its active participation in bilateral and multilateral solutions to digital trade rule-making, digital trade rule-making remains an uphill task. First, variation in the specificity, depth, and breadth of digital trade provisions is stark. Although variation in digital trade provisions creates leeway for countries in the adoption of measures (Burri, 2022; Gasser, 2006), it also undercuts the potential benefits countries reap from the digitalisation of the global economy. Regulatory heterogeneity resulting from the “e-spaghetti bowl” of digital trade provisions generates potential negative effects reminiscent of that of the “spaghetti bowl” of PTAs, including the complexity of overlapping trade rules which generate inefficiencies (Wunsch-Vincent & Hold, 2011). Uncoordinated regulations across countries also undermine trade and growth opportunities (World Economic Forum, 2020). For example, inconsistent regulations on personal data protection increase trade costs, such as how domestic regulations that inhibit data sharing on shipping information with foreign companies adversely affect ocean supply chain visibility (WTO and World Economic Forum, 2022, 27-28). Furthermore, patterns of divergence in digital trade policy by countries foreground the potential emergence of separate or contrasting models of digital trade governance (Aaronson & Leblond, 2018; Azmeh, Foster, & Echavarri, 2020; Gao, 2018). This could create a situation where some countries have a competitive advantage over others. For example, countries with more permissive rules around cross-border data flows may be able to attract more investment than countries with more restrictive rules. This can create an uneven playing field in digital trade. Especially where these models are led by major players in the global economy, the patchwork of rules potentially becomes a source of tension and competition among countries.

Second, obligations laid out in digital trade provisions are often onerous undertakings for countries. Digital trade provisions often involve a harmonisation of domestic laws and regulations across countries. Harmonisation requires coordinating domestic systems, which in themselves may differ and where even domestic changes require balancing competing interests and stakeholders. Potential conflicts may consequently arise, for example, between regulations on data localisation and the free flow of data, both of which are important aspects of digital trade provisions. Other sources of conflict include the tradeoff between intellectual property protection on the one hand, and the need for innovation and competition on the other hand. Thus, even if countries recognise the benefits of a consistent and common set of standards and systems for engaging with the digital economy, overcoming these regulatory challenges remains a laboured process. Insofar as these digital trade provisions have been or are rigorous, the uptake of digital trade provisions has been and will likely continue to be slow and uneven across agreements and countries.

4.3 Bridging the Gap: DEAs

Developing a governance framework for digital trade and overcoming the fragmentation of digital trade rules is thus a complex, and urgent, policy problem. The need to bridge the gap between a governance framework that has not kept pace with the technological developments and the changing nature of global trade, gains further salience with rising digital protectionism and other coordination challenges between economies. In the face of the many challenges of digital trade rule-making, DEAs present an opportunity for advancing digital trade governance.

DEAs deepen existing commitments and also further specify these provisions or expand coverage of digital trade issues. For instance, while provisions on paperless trade which were first introduced in 2000 in the New Zealand-Singapore Closer Economic Partnership Agreement, have been incorporated in numerous FTAs, DEAs further include provisions on customs procedures automatisation and electronic transferrable records. Commitments on paperless trading require only that trade administration documents are made available and acceptable in electronic forms, whereas commitments on electronic transferable records accord electronic records the same legal effect, validity, and enforceability as existing forms of documentation (UNCITRAL, 2018). These more in-depth provisions also go beyond paperless trading to include automatisation, electronic exchange of information, rules on the Internet of Things regarding trade facilitation, and more. DEAs have also advanced digital trade governance by introducing or enhancing provisions on the facilitation of cross-border e-commerce, promotion of the free flow of data, and protection of personal data and intellectual property. By making digital trade provisions legally stronger and/or more specific, DEAs provide a more modern, comprehensive, and coherent framework for promoting and regulating digital trade in a fast-evolving global economy.

DEAs are further promising for several reasons. Not only are the DEAs a new form of trade policy, but it also ramps up digital trade governance beyond the limited and slow-moving negotiations at the WTO and other multilateral forums such as the Asia-Pacific Economic Cooperation or the Organisation for Economic Cooperation and Development. Despite the centrality of the WTO in trade governance, WTO JSI on E-Commerce negotiations has progressed slowly. It was only in 2019 that delegations of several countries issued a joint statement on e-commerce to commence WTO negotiations on trade in e-commerce. This came two years after a bid for an agreement to begin discussions on digital trade rules ended in a stalemate at the 11th WTO Ministerial Conference in Buenos Aires, which “led 70 of the WTO’s 164 members, including the US, the EU, and smaller economies such as Australia, to declare that they would pursue their own deal outside the WTO’s usual negotiating stream” (Financial Times, 2017). While the JSI has been successful in producing ‘clean text’ on relatively uncontroversial areas such as online consumer protection, open government data, restricting spam, and recognising e-signatures, progress has been impeded in more divisive issues. Provisional

extension of the 25-year-old WTO Moratorium on E-commerce, a cornerstone of the WTO e-commerce work programme that started in 1998, until only the next ministerial in December 2023 suggests the tenuousness of traditional, multilateral platforms for trade negotiations where issue linkage threatens to undermine progress on negotiations.

Furthermore, DEAs are a new form of trade policy that is deliberately designed to facilitate participation and generate consensus around modules of issues. For example, DEPA is organised around 12 modules on Business and Trade Facilitation, Digital Identities, and Digital Inclusion, among others. The modular structure of DEAs is juxtaposed against the structure of PTAs, which requires them to be considered in totality. Conversely, countries are able to join DEAs in their entirety, incorporate specific modules into current or future agreements or co-opt them into other trade negotiations (Bacchus, 2021; Ramasubramanian, 2020). The modular structure of the DEA thus offers flexibility for countries. This is potentially promising for trade governance as it enables an acceleration of cooperation on issues on which members are better able to come to a consensus while allowing others to engage separately at other levels of cooperation on other issues. This offers a potential solution to the stalling of entire agreements because of irreconcilable differences on specific issues among negotiating parties, a problem that has stymied several long-drawn or deadlocked trade negotiations such as the Environment Goods Agreement that collapsed in 2016 or bilateral trade talks between the US and India. Insofar as multilateral trade negotiations, in particular WTO platforms, have faced these difficulties, smaller “plurilateral” agreements in the form of DEAs may be the way forward in digital trade governance.

4.4 Towards a more coherent digital trade regime

Whether through upgrades to existing FTAs or more recent models of trade deals – such as DEAs, constructing a coherent digital trade regime enables countries to harness the digital interconnectedness of economies for growth. Developing a coherent digital trade regime involves not only the articulation of clear rules to govern digital trade but also that these sets of rules are consistent and common across countries. Turning to Singapore’s commitments to digital trade in its agreements offers insights into ways forward for digital trade governance. Despite the extent of digital trade provisions in Singapore’s agreements, there is room for strengthening commitments in particular issue areas. To the extent that Singapore is at the forefront of digital trade rule-making, these issue areas simultaneously reflect aspects of digital trade that are challenging to negotiate or enforce and present opportunities for progress in digital trade governance. These issue areas include broad-based non-discriminatory provisions and the use of exceptions.

Broad-based non-discriminatory provisions

Issue areas in which Singapore’s commitments to digital trade can be enhanced are regulatory in nature. While Singapore has made extensive commitments on digital trade provisions that facilitate the ease of conducting digital trade in goods and services, commitments on broad-based openness of the digital economy are few and/or weak. For one, net neutrality rules which entail an expansive commitment to the infrastructure of the data transmission occur in only the Korea-Singapore Digital Partnership Agreement (DPA). Instead of broad-based non-discrimination in the digital economy, digital trade provisions that are prevalent in Singapore’s agreements focus on specific digital technologies that enable digital trade. This includes key elements of digital trade facilitation such as e-invoicing, e-payments, electronic authentication, paperless trading, electronic transferable records, digital identities, and the like. However, multilayered regulatory requirements reduce legal transparency and this lack of legal stability poses significant costs for businesses and other stakeholders in the digital economy (World Economic Forum, 2023).

Instead, broad-based non-discriminatory provisions complement these more specific provisions by enabling a convergence towards common principles and standards between trading partners. This helps establish a shared understanding of best practices and minimum requirements for protecting data and data flows, which can promote trust. Regulatory cooperation in this regard thus “give[s] domestic regulators confidence that allowing data to leave their jurisdiction will not undermine domestic regulatory goals” (Meltzer, 2019, s47). Without this assurance, governments are likely to continue to depend on data localisation requirements and data flow restrictions for reasons including but not limited to privacy protection, national security, and cybersecurity concerns (Meltzer, 2019, s47-48; Svantesson, 2020, 14).

Exceptions and exclusions

Another prominent set of provisions in Singapore’s agreements are exceptions and inconsistency clauses. Exceptions refer to products or sectors that are excluded from e-commerce or digital trade provisions and chapters. They are intended to protect sensitive products, services, or industries and may include temporary or permanent exclusions, tariffs rate quotas or safeguard measures. Security exceptions, for instance, apply to products that are deemed vital to national security. There are 112 security exceptions and 99 explicit general exceptions across all agreements. Singapore has 15 and 16 agreements, respectively, that contain each of these provisions. An example of these exceptions includes Article 15.2 on Security Exceptions, which allows countries to take measures to protect the confidentiality, integrity, and availability of their digital networks and systems for national security purposes.⁷

⁷Article 15.2 on Security Exceptions states, “Nothing in this Agreement shall be construed to: (a) require a Party to furnish or allow access to any information the disclosure of which it determines to

It is also not uncommon to observe in Singapore’s agreements, including its recent DEAs, clauses that exclude the application of certain provisions from specific sectors or industries. These exclusions indicate which provisions prevail in the case of a conflict of laws. A primary source of conflict of laws among agreements is regarding the provisions that directly regulate digital trade and those in services and investment chapters of traditional PTAs that cover digital products or can be delivered electronically. For instance, Article 14.14 on Cross-Border Transfer of Information by Electronic Means in the Korea-Singapore DPA permits the use of measures that may be inconsistent with the provision but achieve a “legitimate public policy objective” provided that the measure does not constitute “arbitrary or unjustifiable discrimination or a disguised restriction on trade” and does not impose restrictions greater than are required to achieve the objective.

Exceptions or exclusions in digital trade provisions potentially undermine the overall effectiveness of agreements in promoting and protecting digital trade. These carve-outs could lead to inconsistencies in digital trade rules, making it difficult for businesses and consumers to navigate. Compliance with multiple sets of regulations is costly, especially for small and medium-sized enterprises (SMEs). Attempts to govern digital trade then present a double-barrelled challenge to SMEs, which are already burdened by a knowledge gap and insufficient access to digital infrastructure, training, and processes (World Economic Forum, 2022a). Exceptions and exclusions may be subject to different interpretations, which potentially create legal loopholes or uncertainty that increase the risk of disputes between parties.

5 Conclusion

Accelerating digital trade rule-making in a fast-evolving domain with lagging rules opens opportunities for countries to leverage the global digital economy. Advancements in digital trade governance are reflected in the introduction of novel digital trade provisions which diffuse across agreements. DEAs, in particular, have the potential to become an important element of the architecture of digital trade governance by providing a new form of digital trade policy that facilitates more and deeper commitments to digital trade. Considerable progress has been made in the development of digital trade rules that govern intellectual property, data protection, and e-commerce. However, the uptake of commitments regarding new data issues such as digital inclusion, digital identities, and Lawtech and Fintech cooperation has been limited.

There remain challenges to fostering a more coherent digital trade regime with clear,

be contrary to its essential security interests; or (b) preclude a Party from applying measures that it considers necessary for the fulfilment of its obligations with respect to the maintenance or restoration of international peace or security, or the protection of its own essential security interests.”

consistent, and common rules. These challenges reflect the difficulties of not only Singapore but also other countries in committing to new rules on digital trade. Nascent digital trade provisions are often rigorous commitments that are onerous for countries to realise. Building on the progress in deepening cooperation on specific digital technologies involved in the trade in digital goods and services, it is also imperative to reduce regulatory heterogeneity and encourage the convergence of principles and standards towards digital trade governance.

While Singapore's digital trade commitments are comprehensive and forward-looking, there is still scope for improvement in specific issue areas. By continuing to refine and update its agreements, Singapore can ensure a facilitating and safe environment for its businesses and consumers to operate and participate in the global digital economy. This includes considering broad-based commitments to openness and interoperability. Despite potentially legitimate justifications for exceptions and exclusions, these still undermine the coherence of the digital trade regime. Concerted efforts to develop solutions that navigate the safeguarding of domestic concerns in ways that do not undermine the cross-border flow of digital goods and services will enable Singapore to take advantage of the continued, rapid digitalisation of the global economy.

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Appendix

Table A1. Novel Provisions

Agreement	Year Signed	Year in Force	Novel Provisions
Israel-Mexico FTA	2000	2000	Reference to the TRIPS
EFTA-Macedonia FTA	2000	2002	Flexibilities for data flows and e-commerce, beyond the e-commerce/digital trade chapter References multilateral agreements relating to intellectual property
Jordan-US FTA	2000	2001	Reference to the applicability of WTO rules on e-commerce or relevant WTO provisions Provisions on transparency pertaining to e-commerce/digital trade Encouraging private sector to self-regulate e-commerce/digital trade Reference to provisions in other chapters like services and investment Provisions that reconcile e-commerce/digital trade with intellectual property Provision on the non-imposition of custom duties on electronic transmissions Provision on electronic transactions framework Provision on the consistency of the domestic legal framework with the UNCITRAL Model Law on Electronic Commerce 1996 Provisions on electronic authentication, electronic signatures or digital certificates Provisions on consumer protection Provisions establishing Principles on Access to and Use of the Internet for e-commerce/digital trade Provisions on cybersecurity Provisions about cooperation on ICT, e-commerce or digital trade, Provisions on the participation of the parties in international fora to promote e-commerce/digital trade

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Table A1 – *Continued from previous page*

Agreement	Year Signed	Year in Force	Novel Provisions
			Provisions whereby business exchanges, cooperative activities or joint activities are encouraged
			Provisions on data protection
			Provisions on data protection with no qualifications
			Provisions on data protection recognising certain key principles
			Provisions on data protection recognising certain international standards
			Provisions on data protection as a least restrictive measure
			Provisions on e-government
			Exclude from the data protection provisions in the e-commerce/digital trade chapter
			internal taxes
			Reference to WIPO Internet Treaties
			Limitations and exceptions to copyright and related rights
			Provisions on technological protection measures (TPMs)
			Provisions on the governmental use of (non-infringing) software
New Zealand-Singapore CEPA	2000	2001	Services (and investment) market access and NT commitments for computer and related services (CRS) sectors
			Services (and investment) market access and NT commitments for telecommunications sectors
			Services (and investment) market access and NT commitments for financial services sectors
			Provision on paperless trading
			Similarity to other PTAs with e-commerce chapter, but not to the US or EU models
			Provision on the free movement of data outside the dedicated e-commerce/digital trade chapter
			Reference to the transfer of data or data flows in computer and related services (CRS) chapter/provisions

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Table A1 – *Continued from previous page*

Agreement	Year Signed	Year in Force	Novel Provisions
			Reference to the transfer of data or data flows in audiovisual chapter/provisions Reference to the transfer of data or data flows in the financial services chapter/provisions
Canada-Costa Rica FTA	2001	2002	Provisions that recognise the importance of promoting or facilitating e-commerce/digital trade Provision on customs procedures automatisation or custom data exchange systems Provisions for the facilitation of e-commerce/digital trade by small and medium-sized enterprises (SMEs) or micro, small and medium- sized enterprises (MSMEs) Provision on facilitation of input by other interested persons in the development of e-commerce/digital trade Provisions allowing government procurement including by use of electronic means
Japan-Singapore FTA	2002	2002	Specific institutional arrangements for e-commerce/digital trade, e.g.: working group, committees, etc Reference to the transfer of data or data flows in the telecommunications chapter/provisions General exceptions explicitly applicable to e-commerce/digital trade and data Specific security exceptions Specific exclusions of measures related to e-commerce/digital trade Provisions on trade secrets, or similar/like protection of undisclosed information/protection of data
Singapore-US FTA	2003	2004	Provision for NT in e-commerce/digital trade Provision for MFN treatment in e-commerce/digital trade Dispute settlement mechanism applies to e-commerce/digital trade provisions and in particular the core provisions on non-discrimination and customs duties Provisions on the duration of the terms of protection of copyright and related rights beyond TRIPS standards

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Table A1 – *Continued from previous page*

Agreement	Year Signed	Year in Force	Novel Provisions
			Provisions protecting encrypted satellite and cable signals Provisions on the liability of Internet Service Providers (ISP) Provisions on safe harbours for Internet Services Providers (ISP) Provisions on the right of reproduction in electronic form in copyright and related rights Provisions on authors' right to publish by wireless means at any time individually chosen
Australia-Singapore FTA	2003	2003	Dispute settlement mechanism explicitly excludes e-commerce/digital trade provisions or chapters Provisions on data protection according to domestic law Inclusion of non-conforming measures (NCMs) on e-commerce Reservations on e-commerce Provisions on Internet Domain names Provisions on storage of works of copyright and related rights in electronic form
Albania-Bosnia and Herzegovina FTA	2003	2004	Provisions to protect Information Rights Management (IRM)
Chile-US FTA	2003	2004	Exclusion of the digital representation of financial instruments as digital products from the data protection provisions in the e-commerce/digital trade chapter
Australia-US FTA	2004	2005	Provision on the custom value of carrier mediums
Trans-Pacific Strategic Economic Partnership Agreement (P4)	2005	2006	Provisions that state that the protection and enforcement of intellectual property should be conducive to a balance of rights and obligations Provisions on digital economy/globalisation of technological innovation and trade
Chile-China FTA	2005	2006	Provision on the principle of technological neutrality
Nicaragua-Taiwan FTA	2006	2008	Provision on the free movement of data Provisions on the availability of documents on the internet
Korea-US FTA	2007	2012	Provisions that balance the copyright and related rights system

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Table A1 – *Continued from previous page*

Agreement	Year Signed	Year in Force	Novel Provisions
Canada-Peru FTA	2008	2009	E-commerce/digital trade chapter indicates which provisions prevail in case of conflict of laws
CARIFORUM-EC EPA	2008	2008	Provisions on Unsolicited Commercial Electronic Message (SPAM) Provisions on data flows in the intellectual property chapter
Colombia-Peru EU FTA	2012	2013	Mechanism to address barriers to data flows Mechanism to address barriers to data flows outside the dedicated e-commerce/digital trade chapter
PAAP	2014	2016	Provisions on net neutrality Provision banning or limiting data localisation requirements Exclusion from the data protection provisions in the e-commerce/digital trade chapter information held or processed by or on behalf of a Party or measures related to such information
EU-Ukraine Association Agreement	2014	2017	Provisions on patents for computer implemented inventions
EAEU	2014	2015	Provisions on standardisation and mutual recognition regarding digital means
Japan-Mongolia FTA	2015	2016	Provisions on source code access Provision banning or limiting data localisation requirements outside the dedicated e-commerce/digital trade chapter
Singapore-Turkey FTA	2015	2017	Consistency of the domestic legal framework with UNECC
TPP	2016	-	Provisions on Internet Interconnection Charge Sharing
USMCA	2018	2020	Provision on interactive computer services Provision on open government data or open data
ASEAN E-commerce Agreement	2019	2021	Provisions on e-invoicing Provisions on the facilitation of e-payments
Australia-Hong Kong FTA	2019	2020	Provision referring to data innovation, allowing data to be shared and reused Provision on competition policy related to the digital economy

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Table A1 – *Continued from previous page*

Agreement	Year Signed	Year in Force	Novel Provisions
EAEU-Singapore FTA	2019	-	Exclusion of government procurement from the data protection provisions in the e-commerce/digital trade chapter
Japan-US DTA	2019	2020	Provisions on cryptography
DEPA	2020	2020	Provision on digital inclusion
Australia-Singapore DEA	2020	2020	Provision on electronic transferrable records Provision on access to encrypted and/or unencrypted communications Provision on digital identities Provision on Financial Technology cooperation Provision on Artificial Intelligence
RCEP	2020	2022	Provision on a future discussion/provisions or agreement on the free flow of data
Chile-Paraguay FTA	2021	-	Specific exclusions of sectors related to e-commerce/digital trade Exclusion from the data protection provisions in the e-commerce/digital trade chapter the financial services sector
Singapore-UK DEA	2022	2022	Provision on source code makes a separate reference to transfer of, or access to, an algorithm Provision on Legal Technology cooperation Exclusion from the data protection provisions in the e-commerce/digital trade chapter the audio-visual services sector

Notes: Agreements are ordered based on the date they are signed. ASEAN: Association of Southeast Asian Nations, CARIFORUM: Caribbean Forum, CEPA: Comprehensive Economic Partnership Agreement, DEA: Digital Economy Agreement, DEPA: Chile-New Zealand-Singapore Digital Economy Partnership Agreement, DTA: Digital Trade Agreement, EAEU: Treaty on the Eurasian Economic Union, EC: European Community, EFTA: European Free Trade Association, EPA: Economic Partnership Agreement, EU: European Union, FTA: Free Trade Agreement, ICT: Information and communications technology, PAAP: Pacific Alliance Additional Protocol, PTA: Preferential Trade Agreement, MFN: Most-favoured-nation, NT: National treatment, RCEP: Regional Comprehensive Economic Partnership, TPP: Transpacific Partnership, TRIPS: WTO Agreement on Trade-Related Aspects of Intellectual Property Rights, UNCITRAL: United Nations Commission on International Trade Law, UNECC: United Nations Convention on the Use of Electronic Communications in International Contracts, USMCA: United States-Mexico-Canada Agreement, WIPO: World Intellectual Property Organisation, WTO: World Trade Organisation

Table A2. Correlation between Agreements

Year Signed	Agreements	NZL-SGP EPA	JPN-SGP FTA	EFTA-SGP FTA	ASEAN-CHN FA	AUS-SGP FTA	SGP-USA FTA	ASEAN-IND FA	JOR-SGP FTA	IND-SGP-ECA	P4	KOR-SGP FTA	PAN-SGP FTA	PER-SGP FTA	GCC-SGP FTA	AANZ-FTA
2002	JPN-SGP FTA	0.78	1.00													
	EFTA-SGP FTA	0.40	0.04	1.00												
	ASEAN-CHN FA	0.70	0.63	0.76	1.00											
2003	AUS-SGP FTA	0.68	0.43	0.27	0.54	1.00										
	SGP-USA FTA	0.24	0.48	0.01	0.23	0.41	1.00									
	ASEAN-IND FA	0.62	0.85	.	.	0.62	0.38	1.00								
2004	JOR-SGP FTA	0.57	0.25	0.37	0.74	0.73	0.41	0.69	1.00							
2005	IND-SGP-ECA	0.59	0.74	.	0.42	0.58	0.61	0.66	0.74	1.00						
	P4	0.72	0.27	0.75	0.73	0.53	0.26	0.63	0.57	-0.01	1.00					
	KOR-SGP FTA	0.63	0.74	0.28	0.56	0.60	0.67	0.63	0.71	0.92	0.32	1.00				
2006	PAN-SGP FTA	0.40	0.66	-0.97	0.28	0.48	0.62	0.59	0.58	0.90	0.01	0.93	1.00			
2008	PER-SGP FTA	0.44	0.70	.	0.34	0.61	0.57	0.58	0.70	0.87	0.28	0.83	0.79	1.00		
	GCC-SGP FTA	0.59	0.47	.	0.48	0.56	0.50	0.71	0.68	0.91	0.27	0.81	0.83	0.73	1.00	
2009	AANZFTA	0.61	0.60	0.31	0.65	0.57	0.21	0.62	0.44	0.36	0.29	0.42	0.50	0.27	0.13	1.00
2010	CRI-SGP FTA	0.37	0.53	-0.06	0.55	0.54	0.65	0.62	0.83	0.92	0.39	0.94	0.93	0.80	0.80	0.36
2013	SGP-TWN FTA	0.38	0.59	.	0.43	0.59	0.57	0.70	0.73	0.84	0.08	0.87	0.93	0.86	0.77	0.32
2015	SGP-TUR FTA	0.67	0.60	0.13	0.63	0.52	0.56	0.51	0.64	0.80	0.20	0.84	0.80	0.74	0.74	0.49
2016	TPP	0.15	0.32	0.36	0.42	0.39	0.81	0.51	0.20	0.34	0.13	0.57	0.33	0.27	0.30	0.43
	AUS-SGP FTA	0.65	0.46	0.66	0.46	0.47	0.60	0.33	0.54	0.64	0.27	0.64	0.54	0.42	0.60	0.34
2018	LKA-SGP FTA	0.65	0.65	0.41	0.61	0.39	0.46	0.50	0.62	0.74	0.12	0.84	0.78	0.58	0.64	0.30
	CPTPP	0.21	0.39	0.41	0.47	0.48	0.70	0.55	0.26	0.41	0.20	0.64	0.44	0.36	0.38	0.45
	EU-SGP FTA	0.60	0.71	0.76	0.65	0.49	0.68	0.54	0.67	0.67	0.41	0.71	0.56	0.56	0.35	0.50
2019	ASEAN DEA	0.26	0.55	.	0.51	0.45	0.06	0.78	0.56	0.38	0.15	0.37	0.44	0.48	0.33	0.43
2020	AUS-SGP DEA	0.02	0.26	.	0.28	0.24	0.02	0.60	0.22	0.32	-0.08	0.37	0.44	0.39	0.43	0.38
	DEPA	0.08	0.27	-0.97	0.19	0.36	0.18	0.46	0.62	0.63	-0.01	0.51	0.60	0.47	0.56	0.34
	ATISA	0.63	0.88	.	.	0.15	0.73	.	-0.95	0.81	-0.94	0.81	0.81	0.73	-0.02	0.61
	RCEP	0.59	0.63	0.50	0.42	0.66	0.43	0.42	0.35	0.64	0.32	0.60	0.35	0.39	0.36	0.54
	GBR-SGP FTA	0.60	0.71	0.76	0.65	0.49	0.68	0.54	0.67	0.67	0.41	0.71	0.56	0.56	0.35	0.50
2022	GBR-SGP DEA	0.08	0.07	.	0.25	0.40	-0.28	0.56	0.62	0.22	-0.04	0.18	0.28	0.39	0.35	0.27
	KOR-SGP DPA	0.01	0.41	-0.22	0.18	0.30	-0.04	0.49	0.54	0.55	-0.11	0.63	0.60	0.64	0.43	0.29
Year Signed	Agreements	CRI-SGP FTA	SGP-TWN FTA	SGP-TUR FTA	TPP	AUS-SGP FTA	LKA-SGP FTA	CPTPP	EU-SGP FTA	ASEAN DEA	AUS-SGP DEA	DEPA	ATISA	RCEP	GBR-SGP FTA	GBR-SGP DEA

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Table A2 – *Continued from previous page*

2002	JPN-SGP FTA																
	EFTA-SGP FTA																
	ASEAN-CHN FA																
2003	AUS-SGP FTA																
	SGP-USA FTA																
	ASEAN-IND FA																
2004	JOR-SGP FTA																
2005	IND-SGP-ECA																
	P4																
	KOR-SGP FTA																
2006	PAN-SGP FTA																
2008	PER-SGP FTA																
	GCC-SGP FTA																
2009	AANZFTA																
2010	CRI-SGP FTA	1.00															
2013	SGP-TWN FTA	0.90	1.00														
2015	SGP-TUR FTA	0.80	0.78	1.00													
2016	TPP	0.38	0.36	0.57	1.00												
	AUS-SGP FTA	0.52	0.59	0.69	0.78	1.00											
2018	LKA-SGP FTA	0.78	0.71	0.87	0.55	0.73	1.00										
	CPTPP	0.47	0.44	0.49	0.97	0.68	0.55	1.00									
	EU-SGP FTA	0.56	0.45	0.68	0.51	0.66	0.65	0.44	1.00								
2019	ASEAN DEA	0.32	0.51	0.23	0.01	0.25	0.28	0.10	0.35	1.00							
2020	AUS-SGP DEA	0.40	0.36	0.39	0.46	0.47	0.42	0.51	0.02	0.41	1.00						
	DEPA	0.65	0.53	0.57	0.38	0.47	0.66	0.40	0.23	0.52	0.77	1.00					
	ATISA	0.61	0.50	0.77	0.64	0.68	0.75	0.67	0.78	-0.07	0.10	0.15	1.00				
	RCEP	0.45	0.40	0.45	0.57	0.50	0.46	0.64	0.42	0.24	0.19	0.39	0.73	1.00			
	GBR-SGP FTA	0.56	0.45	0.68	0.51	0.66	0.65	0.44	1.00	0.35	0.02	0.23	0.78	0.42	1.00		
2022	GBR-SGP DEA	0.17	0.46	0.29	0.15	0.32	0.19	0.18	0.01	0.63	0.70	0.70	-0.98	0.18	0.01	1.00	
	KOR-SGP DPA	0.55	0.72	0.51	0.34	0.53	0.51	0.38	0.17	0.59	0.74	0.76	0.23	0.37	0.17	0.91	

Notes: AANZFTA: ASEAN-Australia-New Zealand FTA, ASEAN: Association of Southeast Asian Nations, ATISA: ASEAN Trade in Services Agreement, AUS: Australia, CHN: China, CPTPP: Comprehensive and Progressive Agreement for Trans-Pacific Partnership, CRI: Costa Rica, DEA: Digital Economy Agreement, DEPA: Chile-New Zealand-Singapore Digital Economy Partnership Agreement, DPA: Digital Partnership Agreement, ECA: Economic Cooperation Agreement, EFTA: European Free Trade Association, EU: European Union, FA: Framework Agreement, FTA: Free Trade Agreement, GBR: United Kingdom, GCC: Gulf Cooperation Council, IND: India, JOR: Jordan, JPN: Japan, KOR: Korea, LKA: Sri Lanka, NZL: New Zealand, P4: Trans-Pacific Strategic Economic Partnership, PAN: Panama, PER: Peru, RCEP: Regional Comprehensive Economic Partnership, SGP: Singapore, TPP: Trans-Pacific Partnership, TUR: Turkey, TWN: Taiwan.

Table A3. Least Common Digital Trade Provisions

Provisions	Soft	Hard	Total	Agreements
Provision on Legal Technology cooperation	1	0	1	Singapore-UK DEA
Exclusion of the financial services sector from data protection provisions in the e-commerce/digital trade chapter	1	0	1	Chile-Paraguay FTA
Provision on interactive computer services	0	2	2	Japan-US DTA, USMCA
Provisions on patents for computer implemented inventions	0	2	2	EU-Ukraine Association Agreement, RCEP
Provision on source code makes a separate reference to transfer of, or access to, an algorithm	2	1	3	Korea-Singapore DPA, New Zealand-United Kingdom FTA, Singapore-UK DEA
Provision on a future discussion/provisions or agreement on the free flow of data	1	2	3	EU-New Zealand FTA, EU-UK TCA, RCEP
Exclusion of the audio-visual services sector from data protection provisions in the e-commerce/digital trade chapter	3	0	3	EU-New Zealand FTA, Singapore-UK DEA, New Zealand-UK FTA
Provisions on data flow in the intellectual property chapter	3	0	3	CARIFORUM-EC EPA, Central America-EU Association Agreement, Central America-UK Association Agreement
Mechanism to address barriers to data flows outside the dedicated e-commerce/digital trade chapter	2	2	4	Colombia-Peru-Ecuador-EU FTA, India-UAE CEPA, Japan-Mongolia FTA, USMCA
Provision on Fintech cooperation	4	0	4	Australia-Singapore DEA, DEPA, Korea-Singapore DPA, Singapore-UK DEA
Provisions on net neutrality	5	0	5	Argentina-Chile FTA, Brazil-Chile FTA, India-UAE CEPA, Korea-Singapore DPA, PAAP
Provision on digital inclusion	4	1	5	Chile-Paraguay FTA, DEPA, India-UAE CEPA, Singapore-UK DEA, New Zealand-UK FTA

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Provisions	Soft	Hard	Total	Agreements
Provision on Artificial Intelligence	5	0	5	Australia-Singapore DEA, DEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA
Provision on competition policy related to the digital economy	6	0	6	Australia-Hong Kong FTA, Australia-Singapore DEA, Australia-UK FTA, DEPA, Korea-Singapore DPA, Singapore-UK DEA
Provision on digital identities	6	0	6	Australia-Singapore DEA, DEPA, India-UAE CEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA
Specific exclusions of sectors related to e-commerce/digital trade	6	0	6	Chile-Paraguay FTA, EU-New Zealand FTA, India-UAE CEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA
Provisions on the facilitation of e-payments	6	1	7	ASEAN E-commerce Agreement, Australia-Singapore DEA, Australia-India ECTA, DEPA, India-UAE CEPA, Korea-Singapore DPA, Singapore-UK DEA
Provisions on Internet Interconnection Charge Sharing	6	1	7	TPP, Australia Singapore FTA, CPTPP, Brazil-Chile FTA, ASDEA, Japan-UK CEPA, New Zealand-UK FTA
Provisions on standardisation and mutual recognition regarding digital means	6	1	7	EAEU, EFTA-Georgia FTA, EU-New Zealand FTA, Korea-Singapore DPA, Korea-New Zealand FTA, Singapore-UK DEA, New Zealand-UK FTA,
Exclusion of government procurement from data protection provisions	6	1	7	Chile-Paraguay FTA, India-UAE CEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA
Provisions that balance the copyright and related rights system	6	1	7	CPTPP, Australia-Hong Kong FTA, Australia-UK FTA, RCEP, TPP

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Provisions	Soft	Hard	Total	Agreements
Provision on electronic transferrable records	8	0	8	Australia-Singapore DEA, Australia-UK FTA, Chile-Paraguay FTA, DEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA, Korea-Singapore DPA
Provision on access to encrypted and/or unencrypted communications	0	8	8	Australia-Singapore DEA, Australia-UK FTA, Chile-Paraguay FTA, DEPA, Japan-UK CEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA
Provisions on cryptography	0	9	9	Australia-Singapore DEA, Australia-UK FTA, Chile-Paraguay FTA, DEPA, Japan-UK CEPA, Japan-US DTA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA
Provision banning or limiting data localisation requirements outside the dedicated e-commerce/digital trade chapter	0	9	9	Argentina-Chile FTA, Australia-Singapore FTA, CPTPP, Japan Mongolia FTA, RCEP, TPP, USMCA
Provision referring to data innovation, allowing data to be shared and reused	9	0	9	Australia-Hong Kong FTA, Australia-Singapore DEA, Australia-UK FTA, Chile-Paraguay FTA, DEPA, India-UAE CEPA, Korea-Singapore DPA, Singapore-UK DEA
Provisions on e-invoicing	9	2	11	ASEAN E-commerce Agreement, Australia-Singapore DEA, Australia-UK FTA, DEPA, EU-New Zealand FTA, India-UAE CEPA, Korea-Singapore DPA, Singapore-UK DEA, New Zealand-UK FTA

Notes: ASEAN: Association of Southeast Asian Nations, CARIFORUM: Caribbean Forum, CEPA: Comprehensive Economic Partnership Agreement, CPTPP: Comprehensive and Progressive Agreement for Trans-Pacific Partnership, DEA: Digital Economy Agreement, DEPA: Chile-New Zealand-Singapore Digital Economy Partnership Agreement, DPA: Digital Partnership Agreement, DTA: Digital Trade Agreement, EAEU: Treaty on the Eurasian Economic Union, EC: European Community, ECTA: Economic Cooperation and Trade Agreement, EFTA: European Free Trade Association, EPA: Economic Partnership Agreement, EU: European Union, FTA: Free Trade Agreement, PAAP: Pacific Alliance Additional Protocol, RCEP: Regional Comprehensive Economic Partnership, TCA: Trade and Cooperation Agreement, TPP: Transpacific Partnership, UAE: United Arab Emirates, UK: United Kingdom, USMCA: United States-Mexico-Canada Agreement

Table A4. Diffusion of Novel Digital Trade Provisions in Singapore's Agreements

Agreement	Year Signed	Provisions	Diffusion
New Zealand-Singapore CEPA	2000	Services (and investment) market access and NT commitments for the telecommunications sector	93
		Services (and investment) market access and NT commitments for the financial services sector	88
		Reference to the transfer of data or data flows in the financial services chapter/provisions	81
		Provision on the free movement of data outside the dedicated e-commerce/digital trade chapter	76
		Provision on paperless trading	72
		Services (and investment) market access and NT commitments for the computer and related services sectors	48
		Reference to the transfer of data or data flows in audiovisual chapter/provisions	43
		Reference to the transfer of data or data flows in computer and related services chapter/provisions	23
Japan-Singapore FTA	2002	Specific security exceptions (national security or similar)	105
		Exceptions and other flexibilities with reference to data flows or e-commerce, outside the e-commerce/digital trade chapter	94
		Specific exclusions of measures related to e-commerce/digital trade	92
		Provisions on trade secrets, or similar/like protection of undisclosed information/protection of data	84
		Reference to the transfer of data or data flows in the telecommunications chapter/provisions	74
		Consideration of specific institutional arrangements for e-commerce/digital trade, e.g.: working group, committees, etc.	29

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Table A4 – *Continued from previous page*

Agreement	Year Signed	Provisions	Diffusion
Singapore-US FTA	2003	Dispute settlement mechanism applies to e-commerce/digital trade provisions and in particular the core provisions on non-discrimination and customs duties	84
		Provisions on the duration of the terms of protection of copyright and related rights beyond TRIPS standards	50
		Provisions on the liability of Internet Service Providers (ISP)	48
		Specific clause on NT for digital products or in the context of e-commerce provisions	39
		Provisions on authors' right to publish by wireless means at any time individually chosen	36
		Specific clause on MFN treatment for digital products or in the context of e-commerce provisions	35
		Provisions on safe harbours for Internet Services Providers (ISP)	35
		Provisions protecting encrypted satellite and cable signals	27
		Provisions on the right of reproduction in electronic form in copyright and related rights	26
Australia-Singapore FTA	2003	Contains an e-commerce/digital trade chapter	105
		Provisions on data protection according to domestic law	59
		Non-conforming measures (NCMs) on e-commerce	38
		Provisions on Internet Domain names	23
		Provisions on storage of works of copyright and related rights in electronic form	21
		Dispute settlement mechanism explicitly excludes e-commerce/digital trade provisions or chapters	15
		Reservations on e-commerce	10

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Table A4 – *Continued from previous page*

Agreement	Year Signed	Provisions	Diffusion
Trans-Pacific Strategic Economic Partnership (P4)	2005	Provisions that state that the protection and enforcement of intellectual property should be conducive to a balance of rights and obligations Provisions on digital economy/globalisation of technological innovation and trade	41 11
Singapore-Turkey FTA	2015	Provision on the consistency of the domestic legal framework with the UN-ECC	13
TPP	2016	Provisions on Internet Interconnection Charge Sharing	6
ASEAN E-commerce Agreement	2019	Provisions on e-invoicing Provisions on the facilitation of e-payments	8 5
DEPA	2020	Provision on digital inclusion	4
Australia-Singapore DEA	2020	Provision on access to encrypted and/or unencrypted communications Provision on electronic transferrable records Provision on digital identities Provision on Artificial Intelligence Provision on Financial Technology cooperation	7 6 5 4 3
RCEP	2020	Provision on a future discussion/provisions or agreement on the free flow of data	1
Singapore-UK DEA	2022	Provision on source code makes a separate reference to transfer of, or access to, an algorithm Exclusion of the audio-visual services sector from the data protection provisions in the e-commerce/digital trade chapter Provision on Legal Technology cooperation	2 1 0

Notes: Diffusion counts all FTAs that have included a given digital trade-related provision since its first introduction. ASEAN: Association of Southeast Asian Nations, CEPA: Comprehensive Economic Partnership Agreement, DEA: Digital Economy Agreement, DEPA: Chile-New Zealand-Singapore Digital Economy Partnership Agreement, FTA: Free Trade Agreement, MFN: Most-favoured-nation, NT: national treatment, RCEP: Regional Comprehensive Economic Partnership, TPP: Transpacific Partnership, TRIPS: WTO Agreement on Trade-Related Aspects of Intellectual Property Rights, UNECC: United Nations Convention on the Use of Electronic Communications in International Contracts, WTO: World Trade Organisation.