Technical Report

Methodology for the OECD Index of Digital Trade Integration and Openness (INDIGO)

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1. Introduction

Against the backdrop of growing domestic barriers to digital trade, countries are increasingly engaging in international regulatory cooperation on digital trade related issues (OECD, 2023[1]). This involves discussions between 91 WTO Members under the Joint Statement Initiative (JSI) on e-commerce; growing digital trade provisions in regional trade agreements (RTAs); new Digital Economy Agreements (DEAs) touching on new and more diverse issues (López-Gonzalez, Sorescu and Kaynak, 2023[2]); as well as a more widespread adoption of instruments with implications for digital trade across different fora, including, APEC, OECD and UNCITRAL (Nemoto and López-González, 2021[3]).

This technical paper sets out the methodology for the construction of the OECD Index of Digital Trade Integration and Openness (INDIGO). The overarching aim of the exercise is to create an indicator that provides useful, up-to-date and comparable information about the *international* (rather than the national) digital trade landscape looking at both trade discussions and relevant discussions taking place in other policy communities. It is hoped that this will enable more focused policy dialogue and better empirical analysis on digital trade policy issues. The next section discusses the framework, scoring and aggregation.

2. Framework, scoring and aggregation

2.1. Identifying the scope of issues covered (the Framework)

The scope of issues covered, the underlying Framework, is based on a combination of ongoing and concluded digital trade and related discussions. This includes existing digital trade provisions in RTAs, discussions at the WTO, including the "stabilised text" for the Agreement on E-Commerce, elements covered in emerging DEAs and emerging issues appearing in other international discussions in other policy communities. This Framework covers five broad policy areas:

- **Enabling e-commerce**: Including issues related to electronic transaction frameworks, electronic authentication and electronic signatures, electronic contracts, electronic invoicing, electronic payments, digitalising border processes and paperless trading.
- **Openness and e-commerce**: Including customs duties on electronic transmissions, as well as access to the internet, telecommunications, ICT goods and open government data.
- **Trust and e-commerce**: Including online consumer protection, unsolicited commercial electronic messages, personal data protection, source code, cryptography, and cybersecurity.
- **Cross-border data flows and data localisation**: Including measures affecting the flow of data and the location of computing facilities.
- **Wider digital economy issues**: Including competition in the digital economy, digital inclusion, digital identities, artificial intelligence, taxation and FinTech.

Each policy area is associated with several specific areas, of which there are 28 in total. They range from electronic transaction frameworks, to personal data protection and artificial intelligence (Table 1).

Table 1. Policy and specific areas covered

Policy area	Specific area
A. Enabling electronic commerce	1. Electronic transaction frameworks
	2. Electronic authentication and electronic signatures
	3. Electronic contracts
	4. Electronic invoicing
	5. Electronic payments
	6. Digitalising border processes
	7. Paperless trading
B. Openness and electronic commerce	8. Non-imposition of Customs duties on electronic transmissions
	9. Open government data
	10. Access to and use of the internet for electronic commerce
	11. Non-imposition of customs duties on ICT goods
	12. Disciplines related to Telecommunication Services
C. Trust and electronic commerce	13. Online consumer protection
	14. Unsolicited commercial electronic messages
	15. Personal data protection
	16. Source code
	17. Cryptography
	18. Cybersecurity
D. Cross-border data flows and data localisation	19. Cross-border data flows
	20. Location of computing facilities
E. Wider digital economy issues	21. Competition policy in the digital economy
	22. Digital identities
	23. Digital inclusion
	24. FinTech cooperation
	25. Artificial Intelligence
	26. Government procurement by electronic means
	27. LawTech cooperation
	28. Taxation

Source: Authors' compilation.

Each specific area is linked to one or several *instruments* or *trade provisions*. For example, area B.8, which falls under *Openness and e-commerce*, relates to customs duties on electronic transmissions. It is linked with:

- the G7 Digital Trade Principles (which provide political support)
- the WTO e-commerce Moratorium
- where it exists, a non-imposition of customs duties on electronic transmissions (NICDET) provision in a trade agreement, and
- for counterfactual analysis, the article of the "stabilised text" of the WTO Agreement on E-Commerce related to the non-imposition of customs duties on electronic transmissions.[1]

The complete Framework can be found in Annex A. The individual instruments and provisions, the building blocks of the framework, are identified from the following sources:

- **Regional and international instruments** are identified using the 2021 OECD Digital Trade Inventory (DTI) (Nemoto and López-González, 2021[3]) as a starting point and updated to reflect

[1] In July 2024, the co-convenors of the Joint Statement Initiative on e-commerce released a statement with the "stabilised text" that has been agreed by 82 of the 91 WTO Members that participated in these discussions. The agreement still has to be integrated into the WTO legal architecture. This is expected to meet a number of challenges.

the latest discussions on digital trade. These include the OECD Privacy Guidelines, APEC cross-border privacy regulation and UNCITRAL model laws.

- **WTO agreements** which can be important for digital trade are identified from the WTO webpage. These include the WTO e-commerce Moratorium, the Information Technology Agreement (ITA), certain elements from the Trade Facilitation Agreement and the Telecommunications reference paper (Annex B).
- **Digital trade provisions in RTAs and DEA** are identified using the latest version of the Trade Agreements Provisions on Electronic-commerce and Data (TAPED) dataset (November 2023) – (Burri, Vasquez Callo-Müller and Kugler, 2023[4]).[2]
- For counterfactual analysis, the "stabilized text" of the **WTO Agreement on E-Commerce** released in July 2024. The text reflects the areas that the co-convenors believe might garner agreement (Annex C).

The Framework is purposefully built with a degree of flexibility and future proofing. For example, currently, under the policy area capturing *wider digital economy issues*, there are entries not identified against particular instruments. This signals that these areas are considered important, even in the absence of any existing international instrument. The aim is to have an underlying framework that is relatively stable but also adaptable to changing circumstances arising from rapid technological and policy developments.

An Expert Group, which met in March 2024 and September 2024, discussed the Framework at length. Overall, it was felt that the Framework adequately captures the issues that matter for digital trade, but it was also noted that there were some issues that were missing. For example, the Framework does not cover market access commitments in goods and services schedules, nor does it capture other provisions located in other chapters of FTAs (beyond the digital trade chapters) – e.g. agreements to share information located in trade facilitation chapters.[3] As a result, the INDIGO should be seen as an indicator of existing regulatory commitments rather than market access commitments. The INDIGO also does not cover enforcement of covered provisions.

2.2. Indicators, scores, aggregation and weights

Given the different nature of the international cooperation efforts tracked, and in keeping with the Digital Trade Inventory (Nemoto and López-González, 2021[3]), two indicators are proposed: one capturing progress on **non-trade related international instruments** (**INDIGO-i**) and another identifying **trade-related instruments** (**INDIGO-t**).

The trade community will, invariably, be most interested in the trade related discussions, which they will largely oversee. However, it will be important to also keep track of ongoing international discussions taking place in other policy communities. The emerging reality is that issues of importance for digital trade are often the remit of other policy communities beyond trade. This includes, for instance, discussions around privacy and data protection, which can have impacts on the ability to transfer data across international borders with consequences for trade (OECD-WTO, 2025[5]). Discussions in this area often happen outside the remit of trade agreements or groupings in places like the G7, the G20, the OECD or APEC.[4]

[2] The TAPED dataset codes preferential trade agreements (PTAs) that cover chapters, provisions, annexes and side documents that directly or indirectly regulate digital trade. For further information, see https://www.unilu.ch/en/faculties/faculty-of-law/professorships/burri-mira/research/taped/ .

[3] It was felt that capturing existing tariff barriers or services commitments, given their sectoral orientation, might be difficult. In terms of provisions in other parts of RTAs that may have implications for digital trade, the remit can be rather wide, so it was felt that it was useful to narrow the focus to areas covered in digital trade chapters. On cross-border flows of non-personal data in other chapters, ongoing work on this matter should provide further insights to inform appropriate handling of this issue.

[4] Other areas where discussions are advancing outside trade circles include competition policy, consumer protection, digital security, taxation among others.

To facilitate analysis, the trade and non-trade discussions are framed under a common Framework (Annex A). This enables a more direct comparison, helping track areas where emerging consensus-building efforts are advancing in other policy communities and where there might be scope for trade discussions to emerge in the future.

That said, it is important to note that the distinction between trade and non-trade issues is blurred. For instance, the adoption of legal instruments related to e-contracts can fall into the INDIGO-i when this reflects the adoption of UNCITRAL instruments. However, they will fall into the INDIGO-t when this reflects a provision in a trade agreement. The guiding rule to categorise discussions is that issues discussed in the context of trade agreements will fall into the INDIGO-t while issues discussed outside trade agreements will be captured by the INDIGO-i.

It is also worth noting that the unilateral adoption of regulation, such as the General Data Protection Regulation (GDPR) in the European Union or the CLOUD Act in the United States, will not be captured in either index as it involves what might be considered as domestic regulatory reform, with no international commitments.[5] Domestic reforms, where relevant to digital trade, are captured in the OECD Services Trade Restrictiveness Index (STRI) and Digital Services Trade Restrictiveness Index (DSTRI).

The scoring, aggregation and weights used to calculate the OECD INDIGO were the subject of extensive discussions across two dedicated Expert Group Meetings and at the Working Party of the Trade Committee. The choices described below are the result of these discussions with the understanding that there are different trade-offs involved across different choices made.

2.2.1. Scoring

For each of the 28 specific areas identified in the Framework there is one or several international instruments (for the INDIGO-i) and trade provisions (for the INDIGO-t) – See Annex A. To build the indicators, each international instrument and trade provision is scored as follows.

For the INDIGO-i, following the OECD DTI (Nemoto and López-González, 2021[3]), the scoring considers whether there is an instrument or not and if this instrument is binding or non-binding:

- The absence of an instrument leads to a score of zero.
- When the instrument is **non-binding**, it will be assigned 0.5 points. This includes instruments which are best endeavours or non-binding recommendations or principles. For instance, the OECD Privacy Guidelines.
- When the instrument is **binding**, it will be assigned 1 point. This includes instruments such as the *United Nations Convention on the Use of Electronic Communications in International Contracts (2005)*.

For the INDIGO-t, the scoring is inspired by the TAPED database, recognising that there are different trade-offs involved in this choice.[6]

- The absence of a trade provision leads to a score of zero.
- When the trade provision has a **soft commitment**, it is assigned 0.5 points. This includes language like ‘best efforts/endeavours’, ‘recognising importance’, ‘promoting’.
- When the trade provision has a **hard commitment**, it is assigned 1 point. This includes provisions which are enforceable and have language such as ‘shall’ or ‘must’.
- While for digital trade provisions in RTAs the scores from the TAPED database are used, WTO instruments and provisions that emerge from the WTO Agreement on E-Commerce (for

[5] Indeed, even in the case of determination of *adequacy* in the context of GDPR this is a unilateral decision rather than a bilateral agreement.

[6] It is recognised that regulation can be scored in several ways. Using the TAPED method for scoring is practical and also ensures a degree of independence in the scoring, which is why it is preferred. One important change that is made, from the November 2024 TAPED database, is that provisions on not imposing customs duties on electronic transmissions are coded as 1 rather than 0.5 when these are not tied to the WTO e-commerce Moratorium discussions.

counterfactual analysis), are scored from scratch. The scoring, shown in Annex B and C, follows a similar approach to the scoring in the TAPED database. For example, if a hard non-imposition of customs duties on electronic transmissions (NICDET) commitment is coded as 1 in the TAPED database, the language in this provision is used as the basis for the coding of the WTO e-commerce Moratorium. The same can be said about privacy provisions in RTAs and those in the 'stabilised text' of the WTO Agreement on E-commerce.

Although there are a number of different ways to score digital trade provisions in trade agreements, the guidance from the Expert Group was that using the TAPED database was the right and most practical choice. Not only does it avoid having to re-code all digital trade provisions in trade agreements from scratch, it also relies on a well-established, robust and independent method of scoring such provisions. That said, it is recognised that distinctions within categories might be important. For example, one might consider whether soft "best endeavour" commitments might be different from soft commitments that utilise language such as "recognising the importance".

Issues also arise in the context of interpreting exceptions in trade provisions, which is why these are not taken into account in the INDIGO. While this can be problematic for assessing the extent of integration and openness, it is felt that it is not the role of the OECD Secretariat to interpret the potential impact of exceptions on international commitments.[7]

Where there are two or more instruments or trade provisions for a given specific area, the maximum score between these is taken to reflect the highest existing commitment (for both INDIGO-i and INDIGO-t). This avoids double counting provisions and is especially important when similar commitments are made in different agreements.

2.2.2. Aggregation and weights

To aggregate the scores, a novel, fully bilateral method is proposed. This implies taking into consideration all possible combinations of bilateral country pairs across all specific areas identified. That is, for each country, of which there are 193, there are 192 partners with potential for agreement across 28 specific areas.[8] For any given year, a country will score full points, 1, in its INDIGO if it has fully binding agreements or hard commitments across all specific areas with all partner countries. It will score zero if it has no agreement with any country. This bilateral method of aggregation enables capturing of both the *depth* and the *spread* of digital trade discussions. It is also readily interpretable as the distance to full integration and openness to digital trade (see example in the next section).

The INDIGO of country *i* at time *t* (for i =1,..,193, j= 1,…192; t=2000,..,2024, and sa=1,…,28) is the sum, across all partners, of the weighted maximum score between that country, *i*, and its partner, *j*, for a specific area, *sa*, where w_{sa} is the weight on the specific area and $max(s_{jsa})$ the maximum score (in the 'Specific Asea') over the product of the number of partners, *J,* and the number of specific areas, *SA*, covered:

$$INDIGO_{it} = \frac{\sum_1^{J=192} w_j \sum_1^{SA=28} w_{sa} \max\left(s_{jsa}\right)}{J * SA}$$

In plain language, the INDIGO is the sum of scores on existing provisions with partners over the total number of possible provisions with all partners:

$$INDIGO_{it} = \frac{SUM\ across\ partners\ of\ maximum\ score\ across\ specific\ areas}{Total\ number\ of\ countries * Total\ number\ of\ specific\ areas}$$

Two sets of weights can be used, one reflecting the size of different markets, w_j, the other reflecting the relative importance of different specific areas, w_{sa}.

[7] See Burri and Kugler (2024[6]) for a discussion of exceptions in digital trade provisions in trade agreements.

[8] Note that for the INDIGO-t there are 167 countries as the European Union is counted as one.

For the size of markets, two options are available:

- **Equal weights**. This implies giving each partner country the same weight (1/192), recognising that markets have equivalent importance ($w_j = 1/J$).
- **Weights based on economic size**. This implies choosing weights that reflect the size of different markets. Since trade-based weights would be endogenous, GDP or population-based weights would need to be used ($w_j = GDP_j/sum(GDP_j)$).

While equal weights do not place a premium on engaging in wider international cooperation with larger markets, weights based on economic size do. The choice of market weights can, however, be contentious, especially in a context where existing digital trade provisions in trade agreements are more prevalent between high-income countries (López-Gonzalez, Sorescu and Kaynak, 2023[2]). Moreover, to avoid fluctuations in the INDIGO arising from changes in the weights rather that changes in prevailing international cooperation practices, weights will need to be *static*, that is, they will need to reflect one particular year rather than changing on a yearly basis.

The choice of equal weights over weights based on economic size has important implications for the values of the indicator. Since digital trade agreements tend to be between high-income countries, weights based on economic size nearly double the existing INDIGO score relative to using equal weights (Annex D). To some extent, equal weights capture the breadth of international cooperation while weights based on market size capture the economic importance of these. Given that interest was expressed in both equal and economic size weights, the database that will be created will include both.

For the weights applied to specific areas, w_{sa}, four options were considered:

- **Equal weights**. This can be applied across the 28 specific areas, assigning a 1/28 weight for each ($w_{sa} = 1/SA$).
- **Distributed weights.** This is when equal weights are assigned across policy areas (1/5) and then equal weights allocated to specific area. Ultimately, this means that the weights assigned to a specific area will depend on how many of these there are in a particular policy area – $w_{sa} = \left(\frac{1}{PA}\right)\left(\frac{1}{SA_{PA,j}}\right)$.
- **Expert weights across the five policy areas**. This would involve asking a group of experts to assign weights across the different policy areas thereafter equal weights across the specific areas that compose these (as is the case in the DSTRI) – $w_{sa} = (e_{PA})\left(\frac{1}{SA_{PA,j}}\right)$, where e_{PA} is the expert weight across policy areas which must add up to one.
- **Weights based on empirical findings**. One potential avenue to pursue is whether empirical analysis can be used for weights. For instance, identifying coefficients from RTA provisions in trade agreements as determinants of the weights – $w_{sa} = (g_{PA})\left(\frac{1}{SA_{PA,j}}\right)$, where g_{PA} are obtained from the coefficients of specific policy areas in a gravity model.

The Expert Group discussed the weighting structure of the specific areas at length, recognising the difficulties in choosing weights. While different views were expressed, there was a shared understanding that there was value in keeping things simple. Expert weights, although appealing, raise several issues, including that they can be considered subjective. They can also be difficult to justify, given challenges in identifying experts with a wide view of the trade-offs across all the different specific issues covered. In turn, empirical weights, while evidence-based, can be difficult to calculate and can raise issues of endogeneity.[9] Furthermore, the use of weights derived from gravity estimations can also be problematic subsequently, when the Index is used in a gravity model to estimate the impact of changes in levels of digital trade integration and openness.

[9] For example, the use of weights based on gravity estimations can lead to biases. These arise from the fact that trade flows are themselves affected by the presence of trade agreements with digital trade provisions.

Moreover, the choice of issue weights, when not too extreme, turns out to not to have significant implications for the overall variance of the indicator (Annex D). For example, the global index, taken as the average of all country indices, is highest using equal weights, then using distributed weights and then gravity weights, but these all remain within a 5% range in terms of changes in value. For the country indices, while the impact of using different weights remains small, the order can change, reflecting the depth of the different provisions signed.

While it is acknowledged that weighting issues will always be a contentious issue, the INDIGO will rely on **distributed weights**, which place equal importance on each policy area, but which give more importance to those with fewer specific areas (Table D.1). In this instance, this means that issues such as cross-border data flows and data localisation will have a higher weight, which also reflects their well-established importance for digital trade.

2.2.3. Intuition behind the mechanics of the INDIGO

A reduced sample example can illustrate the intuition and mechanics that underlie the INDIGO. Consider a world with no digital trade agreements which is composed of six countries (Country A to Country F) all of which are the same economic size and where, for a specific year, there is potential for agreement across five areas (Area 1 to Area 5) and where equal weights are given across these.[10] For a country to obtain full points on the INDIGO, a value of 1, it would have to have binding or hard commitments across all areas with all existing partners.

If Country A were to sign a deep digital trade agreement with Country B involving full commitments across the five areas covered, then its INDIGO-t score would be of 0.2. This reflects that Country A has gone as far as it could, score of 1 per issue, with 1/5th of all countries.[11] If Country A then signs another full and deep agreement with Country C, then its INDIGO would double, increasing to 0.4.[12] This reflects that it has gone as far as it could on digital trade issues with two out of the five countries. The indicator, therefore, provides a measure of both the spread but also the depth of agreements in place.

To calculate the global indicator, the average values across all countries are taken.[13] In the case of the first scenario where there is a deep agreement between Country A and Country B, the global measure would be 0.06. This is Country A's 0.2 score and Country B's 0.2 score added together (0.4) divided by the number of countries in the sample, 6.[14]

This example shows that, while the INDIGO-t can be relatively high for a particular country, globally, it can be relatively low if agreements are not widespread. The total combination of possible unidirectional agreements in this reduced sample is 30 (6x5). The indicator shows that the deep agreement in place represents a small fraction of all possible agreements.

Now consider what happens if five out of the six countries sign a less ambitious (score of 0.5 instead of 1 per area) but more widespread plurilateral agreement. Each signing country would get a score of 0.4, reflecting that agreements have been signed with four out of six countries and that these are only attracting half the available score across the different issues (due to the lower level of commitment).[15] Overall, the global score would be 0.33.[16] The interpretation of this number is that, in this example of 6 countries, the world economy is 1/3 of the way towards a global open digital trade.

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[10] In the context of equation (1) this implies that J=6, SA=5, $w_j=1=w_{sa}$, s will depend on the depth of the agreement.

[11] INDIGO= 1 (full score)*1(weight)*5 (the number of areas covered) / 5(number of partners) *5(areas covered) = 5/25.

[12] INDIGO= 1 (full score)*1(weight)*10 (the number of areas covered – all 5 areas across two countries) / 5(number of partners) *5(areas covered) = 10/25.

[13] Weighted measures based on GDP can also be calculated.

[14] In the case of the second scenario where Country A has a deep agreement with Country B and Country C, the global measure would be 0.13 (more than double compared to the case before). This is Country A's 0.4 score, Country B's 0.2 score, and Country C's 0.2 score added together (0.8) divided by the number of countries in the sample (6).

[15] The $INDIGO_i$ is obtained as follows: 0.5 (score) * 1 (weight) * 4 (number of agreements signed with partners) * 5 (number of areas covered) / 5 (number of partners) * 5 (number of areas) = 0.4.

[16] The overall number is obtained as follows: 0.4 (INDIGO per country that signed the agreement) * 5 (number of countries that signed the agreement) / 6 (total number of countries in the sample) = 0.33

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Annex A. Structure of the policy framework of the INDIGO

The following table is provided for illustrative purposes. It reflects a potential way to map existing *international and regional instruments*, *digital trade provisions in RTAs, WTO Agreements including the 'Stabilised text' of the WTO Agreement on E-Commerce* to different policy areas and incorporates feedback received during the two Experts Meetings. The OECD Secretariat used this table as the basis for discussion in constructing the indicators with OECD Members.

Table A A.1. Structure of the policy framework of the INDIGO

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
A. Enabling electronic commerce	1Facilitating electronic transactions	1Electronic transaction frameworks	- United Nations Convention on the Use of Electronic Communications in International Contracts (2005)	- ec_tech_neutrality_1_1_3 Does the agreement include a principle of technological neutrality (i.e., same treatment for digital supply)?		Article 4: Electronic transaction framework
			- Related national legislation (inspired by international instruments in this area)	- ec_barriers_1_5_1 Does the agreement include a provision on electronic transactions framework?		
			- UNCITRAL Model Law on Electronic Commerce (1996)	- ec__consistency_uncitral_1_5_2 Does the agreement include a provision on the consistency of the domestic legal framework with the UNCITRAL Model Law on Electronic Commerce 1996?		
			- ESCWA Cyber Legislation Directives (2012)	- ec__consistency_unecc_1_5_3 Does the agreement include a provision on the consistency of the domestic legal framework with the United Nations Convention on the Use of Electronic Communications in International Contracts (the 'Electronic Communications Convention', or UNECC)?		

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
			- SADC Model Law on Electronic Transactions and Electronic Commerce (2013)			
		2Electronic authentication and electronic signatures	– United Nations Convention on the Use of Electronic Communications in International Contracts (2005)	- ec_signatures_certificates_1_5_6 Does the agreement include provisions on electronic authentication, electronic signatures or digital certificates?		Article 5: Electronic authentication and electronic signatures
			– Related national legislation (inspired by international instruments in this area)	- ec__consistency_uncitral_1_5_2 Does the agreement include a provision on the consistency of the domestic legal framework with the UNCITRAL Model Law on Electronic Commerce 1996?		
			– UNCITRAL Model Law on Electronic Commerce (1996)	- ec__consistency_unecc_1_5_3 Does the agreement include a provision on the consistency of the domestic legal framework with the United Nations Convention on the Use of Electronic Communications in International Contracts (the 'Electronic Communications Convention', or UNECC)?		
			– UNCITRAL Model Law on Electronic Signatures (2001)			
			– SADC Model Law on Electronic Transactions and Electronic Commerce (2013)			
			– ECOWAS Supplementary Act A/SA.2/01/10 on electronic transactions (2010)			
			- ESCWA Cyber Legislation Directives (2012)			
			- OECD Recommendation of the Council on Electronic Authentication (2007)			

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
		3.Electronic contracts	- United Nations Convention on the Use of Electronic Communications in International Contracts (2005)	- ec__consistency_uncitral_1_5_2 Does the agreement include a provision on the consistency of the domestic legal framework with the UNCITRAL Model Law on Electronic Commerce 1996?		Article 6: Electronic contracts
			- Related national legislation (inspired by international instruments in this area)	- ec__consistency_unecc_1_5_3 Does the agreement include a provision on the consistency of the domestic legal framework with the United Nations Convention on the Use of Electronic Communications in International Contracts (the 'Electronic Communications Convention', or UNECC)?		
			- UNCITRAL Model Law on Electronic Commerce (1996)			
			- SADC Model Law on Electronic Transactions and Electronic Commerce (2013)			
			- ECOWAS Supplementary Act A/SA.2/01/10 on electronic transactions (2010)			
		4Electronic invoicing	- ECOWAS Supplementary Act A/SA.2/01/10 on electronic transactions (2010)	- ec_e_invoicing_1_5_4 Does the agreement contain provisions on e-invoicing?		Article 7: Electronic invoicing
		5Electronic payments	- OECD Recommendation of the Council on Consumer protection in e-commerce (2016)	- ec_facilitation_e_payments_1_5_5 Does the agreement contain provisions on the facilitation of e-payments?	WTO Trade Facilitation Agreement (2017)	Article 10: Electronic Payments
	2. Digital Trade facilitation	6Digitalising border processes	- ASEAN agreement on Customs 1997 amended 2012	ec_custom_automat_1_6_3 Does the agreement contain a provision on customs procedures automatisation or custom data exchange systems?	WTO Trade Facilitation Agreement (2017)	Article 9: Single windows data exchange and system interoperability
			G7 Digital Trade Principles (2021)			

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
		7Paperless trading	- The Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (2016)	- ec_electronic_transfer_records_1_6_2 Does the agreement contain a provision on electronic transferable records?		Article 8: Paperless trading
			- UNCITRAL Model Law on Electronic Transferable Records	- ec_paperless_trade_1_6_1 Does the agreement include a provision on paperless trading?		
			G7 Digital Trade Principles (2021)			
			G20 High Level Principles on Digitalization of Trade Documents			
B. Openness and electronic commerce	3Customs duties on electronic transmissions	8Non-imposition of customs duties on electronic transmissions	- G7 Digital Trade Principles (2021)	- ec_non_imposition_duty_1_4_1 Is there a provision on the non-imposition of custom duties on electronic transmissions?	WTO Moratorium on applying customs duties on electronic transmissions	Article 11: Customs duties on electronic transmissions
	4Access to internet and open government data	9Open government data	- G8 Open Data Charter (2013)	- data_egov_open_data_2_5_2 Does the agreement include a provision on open government data or open data?		Article 12: Open government data
			- OECD Recommendation on Public Sector Information (2008)			
			G7 Digital Trade Principles (2021)			
		10Access to and use of the internet for electronic commerce	G7 Digital Trade Principles (2021)	- ec_internet_principles_1_8_1 Does the agreement include Principles on Access to and Use of the Internet for e-commerce/digital trade?		Article 13: Access to and use of the Internet for electronic commerce
	5Non-imposition of duties on ICT goods	11Non-imposition of duties on ICT goods	-		Information Technology Agreement (1996)	
					ITA Expansion Agreement (2015)	

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
	6Telecommunications	12. Disciplines related to Telecommunication Services	-	- ec_ser_ma_nt_tel_1_2_3_2 Are there services (and investment) market access (MA) and NT	WTO Telecommunications Reference Paper (1996)	Article 21: Telecommunications
C. Trust and electronic commerce	7. Consumer protection	13. Online consumer protection	- OECD Recommendation of the Council on Consumer protection in e-commerce (2016)	- ec_consumer_protection_1_7_1 Does the agreement include provisions on consumer protection?		Article 14: Online consumer protection
			- SADC Model Law on Electronic Transactions and Electronic Commerce (2013)			
			G7 Digital Trade Principles (2021)			
		14. Unsolicited commercial electronic messages	- OECD Recommendation of the Council on Consumer protection in e-commerce (2016)	- ec_spam_1_7_2 Does the agreement include provisions on Unsolicited Commercial Electronic Messages?		Article 15: Unsolicited commercial electronic messages
			- SADC Model Law on Electronic Transactions and Electronic Commerce (2013)			
	8. Privacy	15. Personal data protection	- OECD Privacy Guidelines 1980 amended 2013	- data_prot_prov_2_1_1 Does the agreement include provisions on data protection?		Article 16: Personal data protection
			- OECD Recommendation of the Council on Consumer protection in e-commerce (2016)	- data_prot_int_standards_2_1_5 Does the agreement include provisions on data protection recognising certain international standards?		
			- APEC Privacy Framework 2005 amended 2015			
			- APEC Cross-Border Privacy Rules (CBPR) system (2011)			
			- Global CBPR Forum (2022)			
			- Convention 108 (1981)			
			- 2001 Additional Protocol to the Convention 108 (2001)			

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
			- Convention 108+ (2018)			
			- AU Malabo Convention (2014)			
			- ASEAN PDP Framework (2016)			
			- ESCWA Cyber Legislation Directives (2012)			
			- ECOWAS Supplementary Act A/SA. 1/01/10 on Personal Data Protection (2010)			
			- Data Protection Standards of the Ibero-American States (2017)			
			- OAS Updated Principles on Privacy and Personal Data Protection (2021)			
			G7 Digital Trade Principles (2021)			
			UN Global Digital Compact (2024)			
	9. Business trust	16. Source code	G7 Digital Trade Principles (2021)	- ec_source_code_1_9_1 Does the agreement include prohibitions to require the transfer of, or access to, source code of software owned by a person, as a condition for the import, distribution, sale or use of such software?		
		17. Cryptography	- OECD Guidelines on Cryptography Policy (1997)	- ec_crypto_1_9_3 Does the agreement include provisions on cryptography?		
	10. Cybersecurity	18. Cybersecurity	- OECD Recommendation of the Council concerning Guidelines for the Security of Information Systems (1992-2002)	- ec_prov_cybersec_1_10_1 Does the agreement include provisions on cybersecurity?		Article 17: Cybersecurity

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
			- OECD Recommendation of the Council Concerning Guidelines for the Security of Information Systems and Networks - Towards a Culture of Security (2002-2015)			
			- OECD Recommendation on Digital Security Risk Management for Economic and Social Prosperity (2015-2022)			
			- OECD Recommendation of the Council on Digital Security Risk Management (2022)			
			- OECD Recommendation on Digital Security of Critical Activities (2019)			
			- OECD Recommendation of the Council on Consumer protection in e-commerce (2016)			
			- The Convention on Cybercrime of the Council of Europe (Budapest Convention) (2001)			
			- AU Malabo Convention (2014)			
			- ESCWA Cyber Legislation Directives (2012)			
			- ECOWAS Directive C/DIR/1/08/11 on Fighting Cyber Crime (2011)			
			- Wassenaar Arrangement (1996)			
			G7 Digital Trade Principles (2021)			

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
D. Cross-border data flows and data localisation	11. Cross-border data flows and data localisation	19. Cross-border data flows	- OECD Privacy Guidelines 1980 amended 2013	- data_free_flow_prov_2_2_1 Does the e-commerce/digital trade chapter include a provision on the free movement of data?		
			- APEC Cross-Border Privacy Rules (CBPR) system (2011)			
			- Global CBPR Forum (2022)			
			- Convention 108 (1981)			
			- Convention 108+ (2018)			
			- ASEAN PDP Framework (2016)			
			G7 Digital Trade Principles (2021)			
			UN Global Digital Compact (2024)			
		20. Location of computing facilities	G7 Digital Trade Principles (2021)	- data_flow_proh_loc_2_2_3 Does the e-commerce/digital trade chapter contain a provision banning or limiting data localisation requirements?		
E. Wider digital economy issues	12. Wider Digital Economy Issues	21. Competition policy in the digital economy	- OECD Recommendation concerning International Co-operation on Competition Investigations and Proceedings (2014)	- new_data_issues _comp_policy_3_1 Does the agreement contain a provision on competition policy related to the digital economy?		
			UN Global Digital Compact (2024)			
		22. Digital identities	- OECD Recommendation of the Council on the Governance of Digital Identity (2023)	- new_data_issues_dig_identities_3_2 Does the agreement contain a provision on digital identities?		

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
			UNCITRAL Model Law on the Use and Cross-Border Recognition of Identity Management and Trust Services (2022)			
		23. Digital inclusion	UN Global Digital Compact (2024)	- new_data_issues_dig_inclusion_3_ 3 Does the agreement contain a provision on digital inclusion?		
		24. FinTech cooperation	-	- new_data_issues_fintech_3_4 Does the agreement contain a provision on Financial Technology (Fintech) cooperation?		
		25. Artificial Intelligence	- OECD Recommendation of the Council on Artificial Intelligence (2019)	- new_data_issues_ai_3_5 Does the agreement contain a provision on Artificial Intelligence (AI)?		
			- G20 AI Principles (2019)			
			Global Partnership on Artificial Intelligence (GPAI) (2020)			
			UNESCO Recommendation on the Ethics of Artificial Intelligence (2022)			
			G7 initiatives on AI (2023) (International Code of Conduct for Advanced AI Systems, Guiding Principles for Organizations Developing Advanced AI Systems, Action Plan for promoting global interoperability between tools for trustworthy AI)			
			Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law (2024)			

Policy area	Broad area	Specific area	Regional and international instruments	RTAs and DEAs provisions on digital trade (TAPED dataset)	WTO Agreements	'Stabilised text' WTO Agreement on E-Commerce (July 2024)
		26. Government procurement by electronic means	-	- new_data_issues_gov_proc_3_6 Does the agreement include an understanding or provisions allowing government procurement including by use of electronic means?	WTO Government Procurement Agreement	
		27. LawTech cooperation	-	- new_data_issues_lawtech_3_8 Does the agreement contain a provision on Legal Technology (Lawtech) cooperation?		
		28. Taxation	OECD/G20 Inclusive Framework on BEPS (package with 15 Actions) (2016)			
			Multilateral Convention to Implement Tax Treaty Related Measures to Prevent BEPS (BEPS MLI) (2018)			
			Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy (2021)			

Annex B. Scores WTO Agreements

WTO Agreement	Score	Specific area in OECD INDIGO framework
WTO Trade Facilitation Agreement (entered into force in 2017)	1	5. Electronic payments
WTO Trade Facilitation Agreement (entered into force in 2017)	1	6. Digitalising border processes
WTO Moratorium on applying customs duties on electronic transmissions	1	8. Non-imposition of customs duties on electronic transmissions
Information Technology Agreement ITA (1996)	1	11.Non-imposition of duties on ICT goods
ITA Expansion Agreement (2015)	0*	11; Non-imposition of duties on ICT goods
WTO Telecommunications Reference Paper (1996)	1	12; Disciplines related to Telecommunication Services
WTO Government Procurement Agreement	1	26. Government procurement by electronic means

Note: *The ITA Expansion Agreement 2015 is currently not coded into the INDIGO so is assigned a score of 0 in this version.

Annex C. Scores 'Stabilised text' WTO Agreement on Electronic Commerce

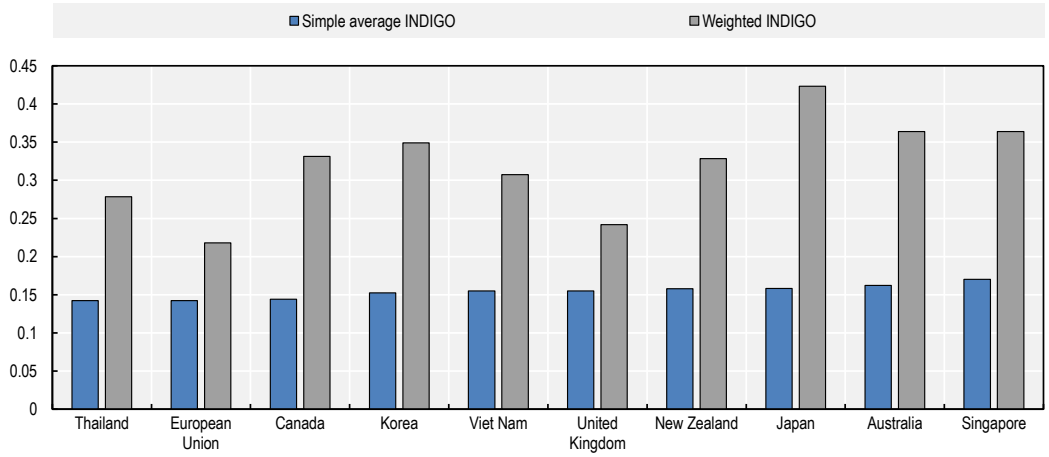
'Stabilised text' WTO Agreement on Electronic Commerce (July 2024)	Score	Specific area in OECD INDIGO framework
Article 4: Electronic transaction framework	0.5	1. Electronic transaction frameworks
Article 5: Electronic authentication and electronic signatures	1	2. Electronic authentication and electronic signatures
Article 6: Electronic contracts	1	3. Electronic contracts
Article 7: Electronic invoicing	1	4. Electronic invoicing
Article 8: Paperless trading	0.5	7. Paperless trading
Article 9: Single windows data exchange and system interoperability	0.5	6. Digitalising border processes
Article 10: Electronic Payments	0.5	5. Electronic payments
Article 11: Customs duties on electronic transmissions	1	8. Non-imposition of customs duties on electronic transmissions
Article 12: Open government data	0.5	9. Open government data
Article 13: Access to and use of the Internet for electronic commerce	0.5	10. Access to and use of the internet for electronic commerce
Article 14: Online consumer protection	1	13. Online consumer protection
Article 15: Unsolicited commercial electronic messages	1	14. Unsolicited commercial electronic messages
Article 16: Personal data protection	1	15. Personal data protection
Article 17: Cybersecurity	0.5	18. Cybersecurity
Article 21: Telecommunications	1	12. Disciplines related to Telecommunication Services

Annex D. Sensitivity of weights

The implications of different weighting structures can be important (Figure A D.1). For example, the use of market size weights increases the scores of individual countries, importantly changing the order of most integrated. With market weights, Japan becomes the most integrated country, surpassing Singapore. The United Kingdom and the European Union also lose position, largely because existing FTAs do not include the United States or the People's Republic of China, unlike for Japan.

Figure A D.1. Market-size weights

GDP weights applied to top 10 countries

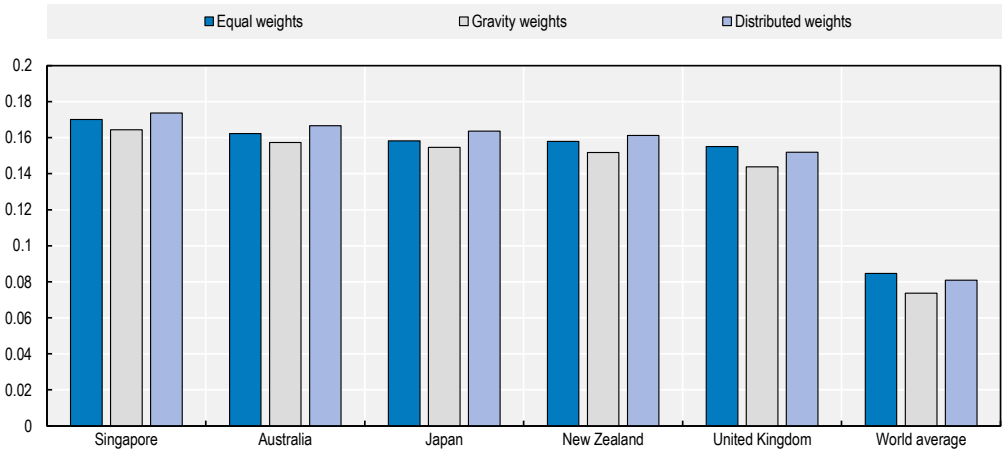


Note: Weights are based on market size (GDP) of partners.
Source: Own calculations.

Weights capturing the relative importance of issues make less of a difference to overall scores (Figure A D.2). Overall, equal weights give rise to a higher INDIGO in the context of the global indicator (World average). However, the overall impact depends strongly on the types of agreements signed by different countries. For Singapore, distributed weights give rise to the highest score, reflecting that Singapore has strong data flow and data localisation provisions which these weights give stronger importance to. However, for the United Kingdom, it is equal weights that lead to higher scores.

Figure A D.2. Issues weights

INDIGO using different weights



Note: See Table D1 for weights used.
Source: Own calculations.

The issue-based weights can be found in Table A D.1.

Table A D.1. Issue-based weights

Policy area	Specific area	Equal weights	Distributed weights	Gravity weights
A. Enabling electronic commerce	1. Electronic transaction frameworks	0.035714	0.028571	0.025588
	2. Electronic authentication and electronic signatures	0.035714	0.028571	0.025588
	3. Electronic contracts	0.035714	0.028571	0.025588
	4. Electronic invoicing	0.035714	0.028571	0.025588
	5. Electronic payments	0.035714	0.028571	0.025588
	6. Digitalising border processes	0.035714	0.028571	0.025588
	7. Paperless trading	0.035714	0.028571	0.025588
B. Openness and electronic commerce	8. Non-imposition of Customs duties on electronic transmissions	0.035714	0.04	0.036004
	9. Open government data	0.035714	0.04	0.036004
	10. Access to and use of the internet for electronic commerce	0.035714	0.04	0.036004
	11. Non-imposition of customs duties on ICT goods	0.035714	0.04	0.036004
	12. Disciplines related to Telecommunication Services	0.035714	0.04	0.036004
C. Trust and electronic commerce	13. Online consumer protection	0.035714	0.033333	0.040729
	14. Unsolicited commercial electronic messages	0.035714	0.033333	0.040729
	15. Personal data protection	0.035714	0.033333	0.040729
	16. Source code	0.035714	0.033333	0.040729
	17. ICT products that use cryptography	0.035714	0.033333	0.040729
	18. Cybersecurity	0.035714	0.033333	0.040729
D. Cross-border data flows and data localisation	19. Cross-border data flows	0.035714	0.1	0.101935
	20. Location of computing facilities	0.035714	0.1	0.101935
E. Wider digital economy issues	21. Competition policy in the digital economy	0.035714	0.025	0.024077
	22. Digital identities	0.035714	0.025	0.024077
	23. Digital inclusion	0.035714	0.025	0.024077
	24. FinTech cooperation	0.035714	0.025	0.024077
	25. Artificial Intelligence	0.035714	0.025	0.024077
	26. Government procurement by electronic means	0.035714	0.025	0.024077
	27. LawTech cooperation	0.035714	0.025	0.024077
	28. Taxation	0.035714	0.025	0.024077
		1	1	1

Source: Own calculations.