ECIPE | EUROPEAN CENTRE FOR INTERNATIONAL POLITICAL ECONOMY

DTE | DIGITAL TRADE ESTIMATES

# Digital Trade Restrictiveness Index

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The authors are extremely grateful to Fredrik Erixon for guidance and comments throughout the project process. A special thanks goes to Hanna Deringer who provided an excellent research contribution to this report. We also would like to thank in addition Gabriel Agostini, Niccoló Bonifai, Maria del Carmen Vasquez, Giorgio Garbasso, Rositsa Georgieva, Sara Holmberg, and Antonella Zarra for their research support.

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## Contents

# Executive Summary

- The Digital Trade Restrictiveness Index (DTRI) measures how 64 countries in the world restrict digital trade. This new and ground-breaking index reveals that many leading economies put significant restrictions on digital trade. These restrictions drive up costs for businesses as well as for consumers. Free digital trade, on the other hand, provides consumers with better access to services and goods, and helps businesses in all sectors of the economy to become more efficient and reach new customers.

## COUNTRIES RESTRICTIVE TO DIGITAL TRADE

- **This index shows that China is the most restricted country in digital trade**. China applies sweeping regulatory measures in all aspects of digital trade, including trade in digital goods and services, investment in the information and communications technology (ICT) sector, as well as the movement of data and ICT professionals. **China is followed by Russia, India, Indonesia and Vietnam**. They all have very restrictive regimes for digital trade.

- Generally, the countries that are most restrictive in digital trade are **emerging economies**. China belongs to that group, but it is also an outlier because the country imposes substantially higher restrictions on digital trade than other emerging economies. Just like China, Russia also applies more burdensome digital trade restrictions than could be expected given its level of economic development.

## COUNTRIES OPEN TO DIGITAL TRADE

- **The country that is most open in digital trade, with only a few digital trade restrictions, is New Zealand. Iceland, Norway, Ireland and Hong Kong are also among the most digitally open countries**. These countries are the five least restricted economies in digital trade and have free trade policies applied in most fields of the digital economy.

- All Top Five countries in digital openness are comparatively small economies and therefore more dependent on global markets. Generally, they also have a larger services sector than other countries, which reinforces the role of open digital markets for their economic growth. All five countries have a tradition of being open to international trade and investments.

- Their digital openness boosts productivity and investments in so-called knowledge-based intangibles such as research and developemnt (R&D), design, (digital) training and data, which spurs growth in digital and non-digital sectors. And the reality for all countries is that the combination of open digital borders and a friendly domestic regulatory climate for businesses expands economic prosperity.

## EUROPE AND THE UNITED STATES

- **In Europe, the two most digitally restricted countries are France and Germany**. Both countries have more restrictive digital trade policies than most other developed countries. **France is also the only European country that is part of the Top Ten most restricted countries in digital trade worldwide**. Romania is the third most restricted European country, with a score significantly lower than France and Germany.

- **Besides Ireland and Norway, other European countries that rank high in digital openness are Malta, the Netherlands, Latvia, Luxembourg and Estonia**. This group of countries illustrates that, also in Europe, the most digitally open countries are small economies with a larger services sector compared to digitally restricted countries in Europe.

- Even if the United States is home to many successful digital companies, it applies various restrictive policies in digital trade that are holding back certain sectors of its digital economy. **The index shows that the US has a level of digital restrictiveness that is just above the average level of restrictiveness in all countries covered**.

## KEY TAKEAWAY POINTS FROM THE INDEX

- Digital trade brings clear economic benefits for both businesses and consumers. **Digital trade is already one of the main driving forces behind sustained economic growth**, because it helps countries to improve productivity, a key indicator for technological advancement and the chief source of future economic welfare.

- The index shows that policy responses to digitalisation have been very diverse. Some countries which are relatively small, open and services-oriented embrace the global digital transformation with a long-term perspective, whereas countries that are relatively bigger and emerging often respond with skepticism and significant restrictions to digital trade.

- The high level of digital trade restrictions in emerging economies is worrying because these restrictions undermine their capacity to develop their economies on the back of new technologies in an increasingly data-based global economy. **The digital transformation underway affects all sectors and businesses, and a restrictive regulatory environment for digital trade will weigh down many non-digital sectors**.

- The restrictiveness of these countries may also be a harbinger for how global policy developments in digital trade will unfold. **The Top 10 countries most restricted in digital trade cover nearly half of the world population**. The policy choices that these countries make will certainly have an impact on how global digital policies will take shape.

## ABOUT THE DIGITAL TRADE RESTRICTIVENESS INDEX (DTRI)

- The DTRI is based on a wide spectrum of digital trade policies covering more than 100 categories of policy measures across 64 countries worldwide. The index is the first global initiative to provide transparency of applied digital trade restrictions and sheds light on how countries compare with each other. The index is based on the Digital Trade Estimates (DTE), a database that ECIPE has developed and that is freely available for anyone to use.

- The database and the index are clustered around four larger areas of digital trade policy, namely (A) Fiscal Restrictions and Market Access, (B) Establishment Restrictions, (C) Restrictions on Data, and finally (D) Trading Restrictions. Each cluster contains more specific policy areas, referred to as chapters.

- Cluster (A) covers Tariffs and Trade Defense, Taxation and Subsidies and Public Procurement. Cluster (B) covers Foreign Investment Restrictions, Intellectual Property Rights measures, Competition Policy and Business Mobility. Cluster (C) covers Data Policies, Intermediate Liability and Content Access. Finally, Cluster (D) includes Quantitative Trade Restrictions, Standards and Online Sales and Transactions.

# 1. Introduction

Digital trade is an important part of the world economy – and the movement of data across borders is now a central feature of globalisation. It is therefore critical for the health of the world economy, and for the prospect of economic growth in all countries, that markets are open to the movement of digital goods, services and investment, ICT professionals, and data.

Openness to digital trade will also shape the wider digital economy. It helps businesses to reach foreign digital markets and to provide access to better digital suppliers around the world. It benefits consumers by providing better value for money and a greater variety of digital goods and services to choose from. Digitalisation, therefore, is today one of the main driving forces for higher levels of productivity – a key source for long-term economic growth.

Digital protectionism, on the other hand, slows down productivity in the digital economy. It therefore reduces the prospects for increasing living standards. Digital protectionism will eventually prevent countries from reaping the full economic rewards from all the investments they have made, and continue to make, in the digital economy.

However, not all governments embrace the consequences of digitalisation. In fact, the changes that digitalisation provoke have led some governments to resist the calls for a greater space in the economy for new digital business models. For instance, when sectors such as transport and tourism, historically considered as non-tradable sectors, have become tradable, several governments have acted to protect them against digital disruption. In fact, some countries have reacted to digitalisation by imposing sweeping economic restrictions on digital competition, ultimately affecting digital trade.

For all these reasons, ECIPE is now launching the Digital Trade Restrictiveness Index (DTRI). The DTRI maps and measures policy restrictions to digital trade – all of which are driving up the cost of doing business across borders – in 64 countries. The index covers many trade policy restrictions in the digital economy varying from tariffs on digital products, restrictions on digital services and investments, restrictions on the movement of data, and restrictions on e-commerce. It is the first index of its kind, and it aims to increase transparency in how governments restrict digital trade. The DTRI varies between 0 (i.e. completely open) and 1 (i.e. virtually closed).

The ranking shows that China has the most restrictive policy environment for digital trade (Figure 1.1). The country applies a wide range of measures that restrict digital trade across all policy areas covered in the index. With a score of 0.70, China is also far more restrictive than any other country in the ranking. The country is followed by Russia, India, Indonesia, and Vietnam. These five most restricted countries in digital trade are all middle-income countries. Generally, the index shows that emerging economies are more restrictive than developed economies.

The most digitally restricted country in Europe is France. With a score of 0.36, France is also the only developed country among the 10 most digitally restricted countries covered in the DTRI. France has many restrictive digital policies related to taxation and subsidies, digital competition, data, online sales and transactions. Its neighbour, Germany, also has many restrictions related to the usage and movement of data, digital competition and online sales and transactions. The country has a score of 0.33 and therefore ranks only slightly below France.

New Zealand is the country that is most open to digital trade. It runs a friendly regime in all aspects of digital trade policy and only has a few minor digital restrictions. It has a score of 0.09, considerably lower than the average score of the DTRI, which stands at 0.24.

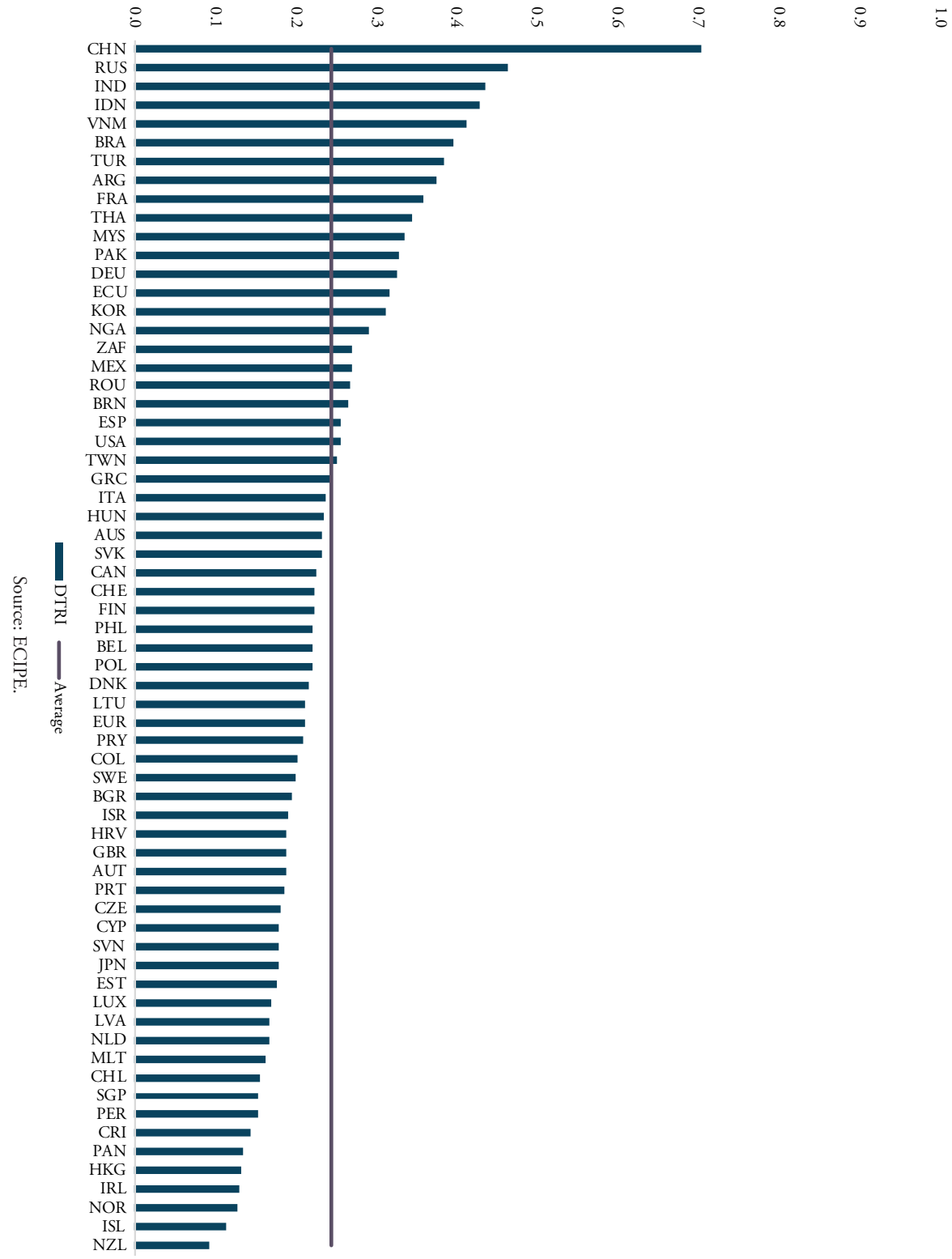



**Figure 1.1**: Digital Trade Restrictiveness Index (DTRI)

Source: ECIPE.

**Box 1:** The Five Most Digitally Restricted Countries in a Nutshell

**China** applies the most restrictive digital trade measures in many areas, including public procurement, foreign investment, Intellectual Property Rights (IPRs), competition policy, intermediary liability, content access and standards. The restrictions do not only impose higher costs for trading digital goods and services, they can also block digital trade altogether in certain sectors. In addition, China's data policies are extremely burdensome for companies, and the country also applies some quantitative trade restrictions and restrictions on e-commerce.

**Russia** applies the most restrictive regime regarding the cross-border movement of data. The country has strict data localisation and data retention requirements, and a series of other data policies that impose high costs for companies. Russia has also implemented strict barriers on the cross-border movement of ICT professionals. In addition, Russia is one of the most digitally restricted countries when it comes to tariffs and trade defence, foreign investment, content access, quantitative trade barriers, and e-commerce.

**India** applies restrictive policies in public procurement and standard setting. In both areas, it is almost as restrictive as China. Furthermore, the country has high tariffs on digital goods, uses several trade defence measures on digital products, and has burdensome barriers in policy fields like taxation and subsidies, foreign investment and IPRs. However, the country remains relatively open in its data policies – creating a framework that has helped India to become a large exporter of ICT services.

**Indonesia** is particularly restrictive in e-commerce, with online retailing being closed to foreign ownership. Limitations on foreign ownership also apply to express delivery services, which reinforce other e-retail restrictions. Indonesia also applies highly restrictive measures in areas such as public procurement, IPRs, intermediary liability, content access, quantitative trade restrictions, and standards.

**Vietnam** has strict licensing and registration requirements for online social networks, general information websites, mobile telecoms network-based services and certain online games services. Companies must physically establish in Vietnam to fulfill licensing and registration requirements. In addition, the country applies restrictive measures in the policy fields of foreign investment, competition policy and movement of data.

In the Top Five group of the most digitally open economies, New Zealand is followed by Iceland, Norway, Ireland and Hong Kong. Notably, all countries in this group are overall open economies. Being small, these countries are very dependent on global markets. Another thing they have in common is that their economies are more services oriented. Interestingly, the two most open economies in digital trade are geographically remote countries. Their openness is likely a deliberate choice by governments to help businesses and consumers to compensate for the high trade costs these two countries otherwise incur when trading in traditional goods markets.

The ranking of countries presented in Figure 1.1 also shows that more restricted countries are generally less developed and less favorably endowed with digital capacities. In addition, they tend to have a relatively smaller services sector. On the other hand, some of these countries are populous, which means they tend to attract a lot of investments and business. As their economies grow, these countries acquire an increasing weight in the global economy.

However, size is no guarantee of economic success. When the global economy is digitally transformed, the advantage of having a big market can be undermined by digital protectionism. Countries lagging in digital openness are at risk of missing out on the new opportunities that digital trade offers.

## WHY DIGITAL TRADE OPENNESS MATTERS

As with any field of trade, open markets promote the exchange of goods and services on the basis of comparative advantage. Trade along the lines of comparative advantage has provided many countries over the years with opportunities to raise productivity, economic growth and living standards. Digital trade is no exception to this rule. Economies with strong digital abilities are therefore well-positioned to produce and export their digital goods and services. Others will stand to benefit from importing them.

Open digital markets bring in greater competition that benefits consumers through lower prices and a greater variety to choose from. For instance, open markets for PCs provide consumers with more opportunities to buy computers of higher quality equipped with better technologies. Similarly, open markets for online publishing services allow users to buy more services at lower prices and to access more advanced online options.

For businesses, open digital markets enhance productivity. Increased digital competition generates greater value in what companies produce with the many goods and services they employ in their production processes. Moreover, when markets are open and competitive, they ensure that these benefits will be passed on to consumers. In the end, this creates higher incomes for everyone.

Open digital markets also encourage the diffusion of new technologies. When digital markets are free from restrictions, they provide companies with opportunities to adopt improved digital technologies from abroad. Furthermore, technology itself has been a strong driver of trade in the last two centuries. For instance, the internet has significantly expanded the scope of trade in digital services. Open and competitive markets, together with the spread of digital technologies, positively influence the technological intensity of the entire global economy.

This is also true for emerging and developing countries. For instance, the internet has considerably cut trading costs, created a new form of services delivery and is the technological source for several new services that can be imported. Digital trade helps these countries to expand their technological know-how, capacity and possibilities to use and produce new goods and services. At the end of the day, countries that are open to digital trade seize the opportunity of building up technology and raise productivity to higher levels that help sustained economic growth.

China is no exception. China is extremely restrictive in digital trade, yet it is also very digitally oriented compared to many other countries. Its digital economy is fast-moving, and its advanced e-commerce market is already one of the biggest in the world. However, so far China has built the provision of digital goods and services almost exclusively on its own market. For digitalisation to sustain growth in the long run, China needs to have more digital competition and greater opportunities for digital entrepreneurs. That is particularly needed to challenge incumbents in sectors that are still relatively closed to digital trade and competition. Open markets support a sophisticated digital economy by providing access to the best available technologies and digital services that help sustain China's long-term economic growth.

## DIGITAL TRADE OPENNESS IN EUROPE AND THE UNITED STATES

Although the DTRI covers a heterogeneous set of countries worldwide, European countries and the United States merit special attention. Almost half of the countries covered in the DTRI are European and, together with the US, they represent more than one-third of trade flows worldwide.

Many European countries and the US are at the digital-economy frontier. That means that they make big technological investments, develop many digital innovations, trade a large number of digital goods and services, and use a high amount of data in their economies. All these factors are crucial for businesses and consumers. Rightly, many Europeans believe that digitalisation will help to create better living standards.

For that to happen, the diffusion of digital technologies and services in Europe's economy needs to improve. Currently, it is slowed down by restrictions on digital trade and costly domestic regulations, both of which have a negative impact on its productivity growth. It is essential for Europe to develop an open digital policy environment in which new innovations and services can thrive, that in turn help to strengthen other sectors that use them. To fully take advantage of the economic opportunities that digitalisation presents, European countries need to improve the conditions for digital enterprises and trade.

That, however, will not be easy. While the European Union (EU) has made good efforts to improve the policy conditions for digital goods and services, the policy fragmentation in Europe and the severity of some of the restrictions in place create "thick" digital borders. It is worth repeating that the DTRI shows that two European countries – France and Germany – are among the 15 most restrictive countries in digital trade policy. Their restrictive culture is very different from the digital openness of a country like Ireland. Their restrictive stand has often prevented the EU from making fast progress to create a Digital Single Market (DSM). After Brexit, France and Germany will be the two dominant EU economies. Their influence in the EU will, therefore, grow, which is likely to make it more difficult to advance the DSM.

Similarly, there is a strong case for the US to reduce its restrictions to digital trade. The US is already considered successful in the digital economy because it is home to many digital entrepreneurs and technology giants. However, its productivity growth has fallen substantially. At the same time, significant parts of the US economy remain unexposed to digitalisation and digital competition. Further openness to digital trade in the US can, therefore, contribute to improving its ailing productivity. It is striking that the US has a DTRI score of 0.26, which is just somewhat higher than, for instance, Greece and Italy. If anything, this shows that there are still substantial barriers left for the US to tackle.

## DIGITAL TRADE ESTIMATES PROJECT

The Digital Trade Estimates (DTE) project sheds light on policy restrictions in the digital economy. More precisely, it is a source of information for policymakers, analysts and businesses who want a better overview on digital trade restrictions covering all aspects of the trade policy field. The DTE is comprised of a database, an index (the DTRI) as well as this report summarising the findings of the analysis. The DTE project is a long-term endeavour that aims at promoting transparency over what measures represent a restriction for digital trade, and which of these measures are currently in force across the world.

### *The DTE Database*

The first major component of the DTE project is a database that contains all policy measures imposed by countries affecting digital trade. The DTE database covers 64 countries globally and represents to date the most comprehensive overview of more than 1,500 different policy measures that have the potential to result in a restriction on the digital trade of goods, services, investment, people and data.

The 64 countries taken up in the DTE database include all EU member states (plus the EU as a whole) and developed and developing countries across all continents. The countries covered are different from each other in several ways, but they all have in common that they are likely to shape future developments in digital trade.

The database is freely accessible and will be repeatedly updated to provide an up-to-date overview of the regulatory environment for each country included. The measures that are examined in the DTE database are diverse, but all of them adversely affect digital trade. For instance, the database includes traditional trade policies such as tariffs on digital goods, regulations in public procurement regarding digital goods and services, or trade-defense instruments applied in ICT sectors. The DTE database also covers new and evolving policy areas such as data localisation requirements and restrictions on online transactions and payments.

### *The DTRI*

Transparency in global digital trade-policy is further enhanced by the DTRI. Although a database of measures offers a first good impression of where in the world most measures are located, their precise depth and severity cannot be readily assessed from purely listing them. This is why the DTRI has been developed.

The DTRI builds on policy measures listed in the DTE database that increase the cost of digital trade. The measures that have been included in the DTE database and used in the DTRI have been assessed on the basis of whether they are (a) discriminatory of foreign providers, (b) discriminatory of digital providers and (c) excessively burdensome, which means that the measure is considered especially trade-distortive to achieve its non-economic objective. In some instances, the index includes indicators measuring the lack of key policies or failures in policy implementation.

The DTRI assigns a score for each country. This score summarises a country's overall restrictiveness of its digital trade policies which have been recorded in the database. The score considers the restrictive nature of each policy by weighing its economic importance for digital trade.

Therefore, the DTRI score assesses whether countries are more or less restrictive in digital trade compared to one another by making clear their cost position. Besides increasing transparency, the index also makes it possible to uncover policy patterns across countries in the global economy, and in general, provides an easy way of comparing countries regarding their digital trade restrictiveness.

All these measures are categorised under 13 chapters, each covering a specific policy field related to digital trade. In turn, these chapters are aggregated into four main cluster areas. Each of these clusters forms a common policy framework and provides easy guidance for readers to understand in which wider part of the economy countries are more or less friendly regarding digital trade.

The cluster areas are:

> **(A) Fiscal Restrictions**. This cluster includes chapters on Tariffs and Trade Defense, Taxation and Subsidies and Public Procurement;
>
> **(B) Establishment Restrictions**. This cluster covers chapters on Foreign Investment Restrictions, Intellectual Property Rights, Competition Policy and Business Mobility;
>
> **(C) Restrictions on Data**. This cluster covers chapters on Data Policies, Intermediate Liability and Content Access; and finally;
>
> **(D) Trading Restrictions**. This cluster includes chapters on Quantitative Trade Restrictions, Standards and Online Sales and Transactions.

The overall DTRI ranges from 0 (i.e. completely open) to 1 (i.e. virtually restricted) with increasing values representing higher levels of digital trade costs for businesses. A similar score has been assigned for each of the 13 chapters in addition to the clusters, which together provide the overall DTRI score. In sum, the overall DTRI condenses the restrictiveness of all the different digital trade policy measures the 64 countries have in place. As a result, the index allows for a ranking of countries according to how costly their policy condition is for digital trade.

## THE STRUCTURE OF THE REPORT

This report aims to present the different components of the DTE project and to clarify both the methodology used as well as the results of the analysis. In the next section, the entire list of country scores can be found, including the rankings across the four clusters for each country.

Section 3 of the report shows each country's position by cluster and chapter in greater detail. It does so by explaining the digital policy environment for each of the 13 chapters in a comprehensive manner. This section highlights the measures imposed by the most restrictive countries in each specific digital trade policy field.

In addition, the most common measures and those measures which are considered to be more restrictive in each of the chapters are also presented. This section will be of interest for those readers who are willing to find out in detail which digital measures are responsible for their respective country scores. The section is organised around the four clusters, under which the respective chapters are presented.

Finally, Section 4 provides the methodology behind the scores of DTRI for each chapter. This part of the report explains the way in which each type of measure has been scored and weighted, and how eventually the more than 100 different categories of measures have been aggregated up into the overall DTRI.

# Chapter 2
# DTRI Rankings

Table 2.1 presents the full DTRI ranking based on the index score for 64 countries covered in our analysis. The table also shows the ranking position of countries in the four main clusters covered in the DTRI index: (A) Fiscal Restrictions, (B) Establishment Restrictions, (C) Restrictions on Data, and finally (D) Trading Restrictions. Each cluster covers certain thematic areas, which we refer to as chapters. The composition of the clusters is the following:

**(A) Fiscal Restrictions:** covering chapters (1) Tariffs and Trade Defense, (2) Taxation and Subsidies, and (3) Public Procurement;

**(B) Establishment Restrictions:** covering chapters (4) Foreign Investment Restrictions, (5) Intellectual Property Rights (IPR) measures, (6) Competition Policy, and (7) Business Mobility;

**(C) Restrictions on Data:** covering chapters (8) Data Policies, (9) Intermediate Liability, and (10) Content Access;

**(D) Trading Restrictions:** covering chapters (11) Quantitative Trade Restrictions, (12) Standards, and (13) Online Sales and Transactions.

The DTRI is a simple average of the four clusters. The clusters themselves are a weighted average of the chapters that belong to each relevant cluster. Each chapter is also comprised of a weighted average across their sub-chapters. This sophisticated weighting approach is explained in detail in Section 4.

**Table 2.1**: DTRI Score and Ranking, Including Clusters A-D

| | DTRI | | A. Fiscal Restrictions & Market Access | | B. Establishment Restrictions | | C. Restrictions on Data | | D. Trading Restrictions | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Index** | **Country** | **Index** | **Country** | **Index** | **Country** | **Index** |
| **1** | **CHN** | **0.70** | IND | 0.63 | CHN | 0.77 | CHN | 0.82 | CHN | 0.63 |
| **2** | **RUS** | **0.46** | BRA | 0.62 | THA | 0.54 | RUS | 0.63 | ARG | 0.57 |
| **3** | **IND** | **0.44** | CHN | 0.60 | VNM | 0.50 | TUR | 0.60 | VNM | 0.51 |
| **4** | **IDN** | **0.43** | ARG | 0.49 | TWN | 0.46 | FRA | 0.45 | BRA | 0.49 |
| **5** | **VNM** | **0.41** | PAK | 0.49 | MYS | 0.45 | IDN | 0.44 | IDN | 0.48 |
| **6** | **BRA** | **0.40** | IDN | 0.43 | CHE | 0.44 | VNM | 0.43 | RUS | 0.43 |
| **7** | **TUR** | **0.38** | ZAF | 0.43 | ECU | 0.42 | DEU | 0.41 | IND | 0.40 |
| **8** | **ARG** | **0.38** | NGA | 0.41 | IND | 0.40 | KOR | 0.39 | TUR | 0.37 |
| **9** | **FRA** | **0.36** | RUS | 0.40 | RUS | 0.40 | BRN | 0.38 | ECU | 0.35 |
| **10** | **THA** | **0.35** | USA | 0.37 | FRA | 0.40 | DNK | 0.35 | MYS | 0.35 |
| **11** | **MYS** | **0.34** | TUR | 0.35 | DEU | 0.40 | MYS | 0.35 | NGA | 0.34 |
| **12** | **PAK** | **0.33** | GRC | 0.33 | USA | 0.38 | LTU | 0.34 | FRA | 0.33 |
| **13** | **DEU** | **0.33** | KOR | 0.33 | IDN | 0.36 | FIN | 0.33 | PAK | 0.31 |
| **14** | **ECU** | **0.32** | PRY | 0.32 | JPN | 0.35 | ITA | 0.31 | TWN | 0.30 |
| **15** | **KOR** | **0.31** | ECU | 0.31 | ZAF | 0.34 | GBR | 0.31 | ESP | 0.29 |
| **16** | **NGA** | **0.29** | CHL | 0.28 | PHL | 0.34 | IND | 0.31 | KOR | 0.28 |
| **17** | **ZAF** | **0.27** | ITA | 0.28 | BRA | 0.33 | PAK | 0.30 | THA | 0.28 |
| **18** | **MEX** | **0.27** | THA | 0.27 | BEL | 0.33 | ESP | 0.30 | HKG | 0.27 |
| **19** | **ROU** | **0.27** | BRN | 0.27 | SVK | 0.33 | HUN | 0.30 | MEX | 0.27 |
| **20** | **BRN** | **0.26** | PHL | 0.27 | BGR | 0.32 | THA | 0.29 | CAN | 0.26 |
| **21** | **ESP** | **0.26** | HUN | 0.26 | COL | 0.32 | ROU | 0.27 | DEU | 0.26 |
| **22** | **USA** | **0.26** | FRA | 0.26 | BRN | 0.32 | POL | 0.27 | ROU | 0.25 |
| **23** | **TWN** | **0.25** | GBR | 0.25 | GRC | 0.31 | MEX | 0.26 | HRV | 0.25 |
| **24** | **GRC** | **0.24** | AUS | 0.25 | ROU | 0.31 | SWE | 0.26 | CYP | 0.25 |
| **25** | **ITA** | **0.24** | MEX | 0.24 | MEX | 0.30 | AUS | 0.25 | ITA | 0.25 |
| **26** | **HUN** | **0.23** | BGR | 0.24 | CAN | 0.29 | CHE | 0.25 | ISR | 0.23 |
| **27** | **AUS** | **0.23** | CZE | 0.24 | AUS | 0.28 | CAN | 0.25 | HUN | 0.22 |
| **28** | **SVK** | **0.23** | DEU | 0.24 | ARG | 0.28 | SGP | 0.25 | POL | 0.20 |
| **29** | **CAN** | **0.23** | LVA | 0.24 | PAN | 0.27 | EUR | 0.24 | SVK | 0.20 |
| **30** | **CHE** | **0.22** | LTU | 0.24 | CRI | 0.26 | GRC | 0.23 | SVN | 0.20 |
| **31** | **FIN** | **0.22** | NLD | 0.24 | PRT | 0.25 | COL | 0.23 | CRI | 0.19 |
| **32** | **PHL** | **0.22** | ROU | 0.24 | NOR | 0.25 | NGA | 0.23 | EST | 0.17 |
| **33** | **BEL** | **0.22** | EUR | 0.23 | NLD | 0.25 | MLT | 0.22 | PHL | 0.17 |
| **34** | **POL** | **0.22** | PRT | 0.23 | KOR | 0.25 | PER | 0.22 | EUR | 0.16 |
| **35** | **DNK** | **0.22** | PAN | 0.22 | PRY | 0.24 | NZL | 0.22 | FIN | 0.16 |
| **36** | **LTU** | **0.21** | VNM | 0.22 | PER | 0.24 | PRT | 0.22 | AUS | 0.15 |
| **37** | **EUR** | **0.21** | CYP | 0.21 | SGP | 0.24 | AUT | 0.21 | BEL | 0.15 |
| **38** | **PRY** | **0.21** | SVN | 0.21 | SWE | 0.23 | ZAF | 0.20 | CZE | 0.15 |

| | DTRI | | A. Fiscal Restrictions & Market Access | | B. Establishment Restrictions | | C. Restrictions on Data | | D. Trading Restrictions | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rank | Country | Index | Country | Index | Country | Index | Country | Index | Country | Index |
| **39** | **COL** | **0.20** | JPN | 0.21 | AUT | 0.23 | ECU | 0.20 | DNK | 0.15 |
| **40** | **SWE** | **0.20** | AUT | 0.21 | ESP | 0.23 | LUX | 0.20 | LTU | 0.15 |
| **41** | **BGR** | **0.20** | BEL | 0.21 | ISR | 0.22 | EST | 0.20 | MLT | 0.15 |
| **42** | **ISR** | **0.19** | HRV | 0.21 | TUR | 0.22 | IRL | 0.20 | COL | 0.14 |
| **43** | **HRV** | **0.19** | POL | 0.21 | EUR | 0.21 | LVA | 0.20 | USA | 0.12 |
| **44** | **GBR** | **0.19** | SVK | 0.21 | PAK | 0.21 | SVK | 0.19 | CHL | 0.12 |
| **45** | **AUT** | **0.19** | ESP | 0.21 | POL | 0.20 | BEL | 0.19 | PRY | 0.11 |
| **46** | **PRT** | **0.19** | SWE | 0.21 | NGA | 0.19 | ISL | 0.19 | ZAF | 0.11 |
| **47** | **CZE** | **0.18** | FIN | 0.21 | LUX | 0.19 | ISR | 0.18 | SGP | 0.11 |
| **48** | **CYP** | **0.18** | DNK | 0.20 | FIN | 0.19 | SVN | 0.18 | JPN | 0.11 |
| **49** | **SVN** | **0.18** | EST | 0.20 | LVA | 0.19 | ARG | 0.17 | AUT | 0.10 |
| **50** | **JPN** | **0.18** | MYS | 0.20 | HRV | 0.18 | HKG | 0.16 | GRC | 0.10 |
| **51** | **EST** | **0.18** | IRL | 0.19 | CZE | 0.18 | CZE | 0.16 | LUX | 0.10 |
| **52** | **LUX** | **0.17** | LUX | 0.19 | CHL | 0.17 | PRY | 0.16 | SWE | 0.10 |
| **53** | **LVA** | **0.17** | MLT | 0.19 | DNK | 0.16 | USA | 0.15 | GBR | 0.10 |
| **54** | **NLD** | **0.17** | CHE | 0.17 | HUN | 0.15 | BRA | 0.15 | BRN | 0.08 |
| **55** | **MLT** | **0.16** | ISR | 0.13 | EST | 0.14 | BGR | 0.14 | ISL | 0.08 |
| **56** | **CHL** | **0.15** | TWN | 0.13 | SVN | 0.13 | CYP | 0.14 | NOR | 0.08 |
| **57** | **SGP** | **0.15** | COL | 0.12 | LTU | 0.12 | NOR | 0.13 | BGR | 0.07 |
| **58** | **PER** | **0.15** | PER | 0.11 | CYP | 0.12 | NLD | 0.13 | IRL | 0.05 |
| **59** | **CRI** | **0.14** | CAN | 0.10 | ITA | 0.11 | TWN | 0.12 | LVA | 0.05 |
| **60** | **PAN** | **0.13** | ISL | 0.09 | ISL | 0.10 | HRV | 0.11 | NLD | 0.05 |
| **61** | **HKG** | **0.13** | CRI | 0.09 | MLT | 0.09 | PHL | 0.11 | PRT | 0.05 |
| **62** | **IRL** | **0.13** | NZL | 0.08 | GBR | 0.09 | JPN | 0.04 | PER | 0.05 |
| **63** | **NOR** | **0.13** | NOR | 0.05 | IRL | 0.07 | CHL | 0.04 | CHE | 0.03 |
| **64** | **ISL** | **0.11** | HKG | 0.02 | NZL | 0.07 | CRI | 0.04 | PAN | 0.02 |
| **65** | **NZL** | **0.09** | SGP | 0.02 | HKG | 0.07 | PAN | 0.03 | NZL | 0.00 |

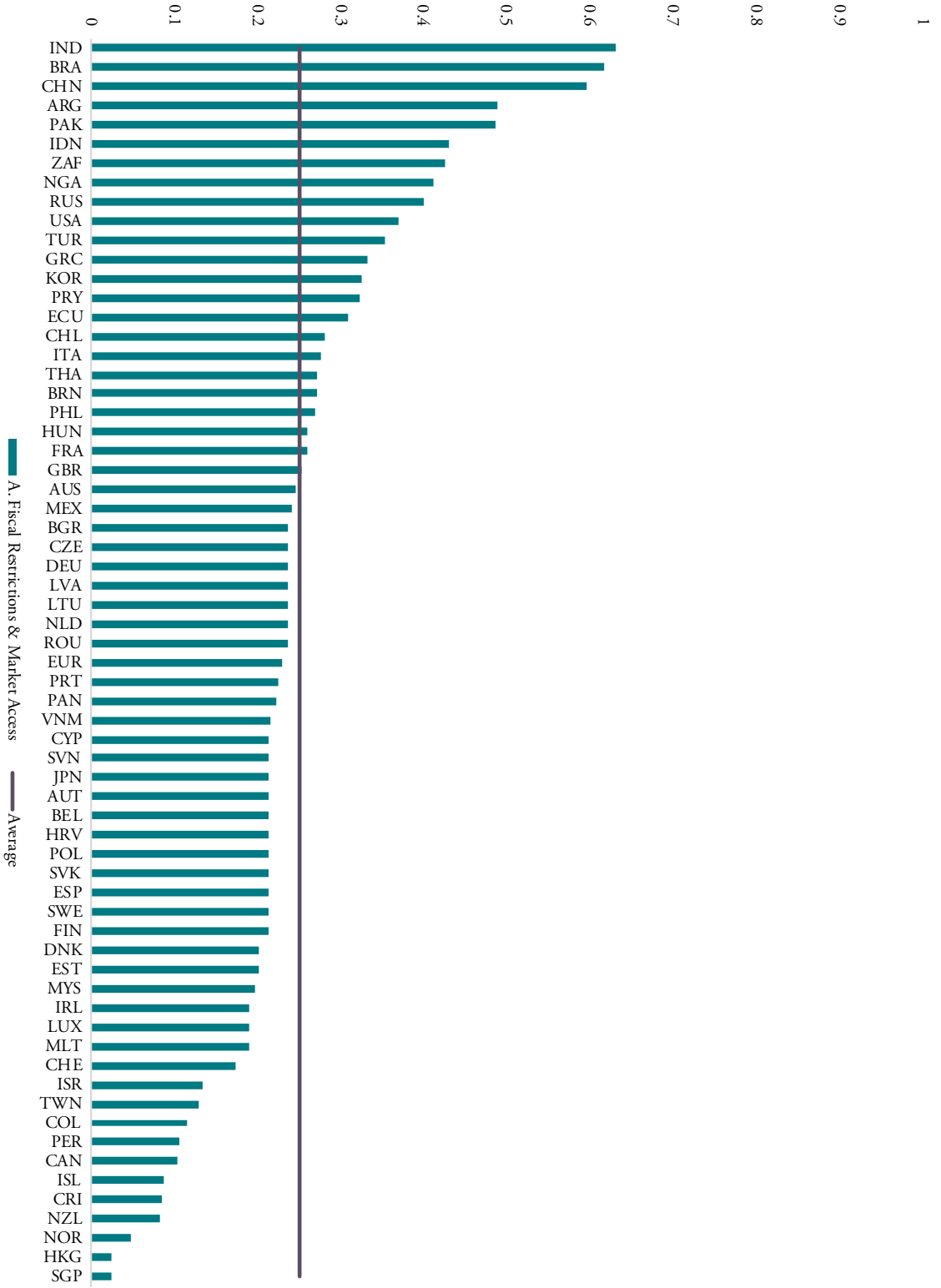



**Figure 2.1**: DTRI Cluster A - Fiscal Restrictions & Market Access

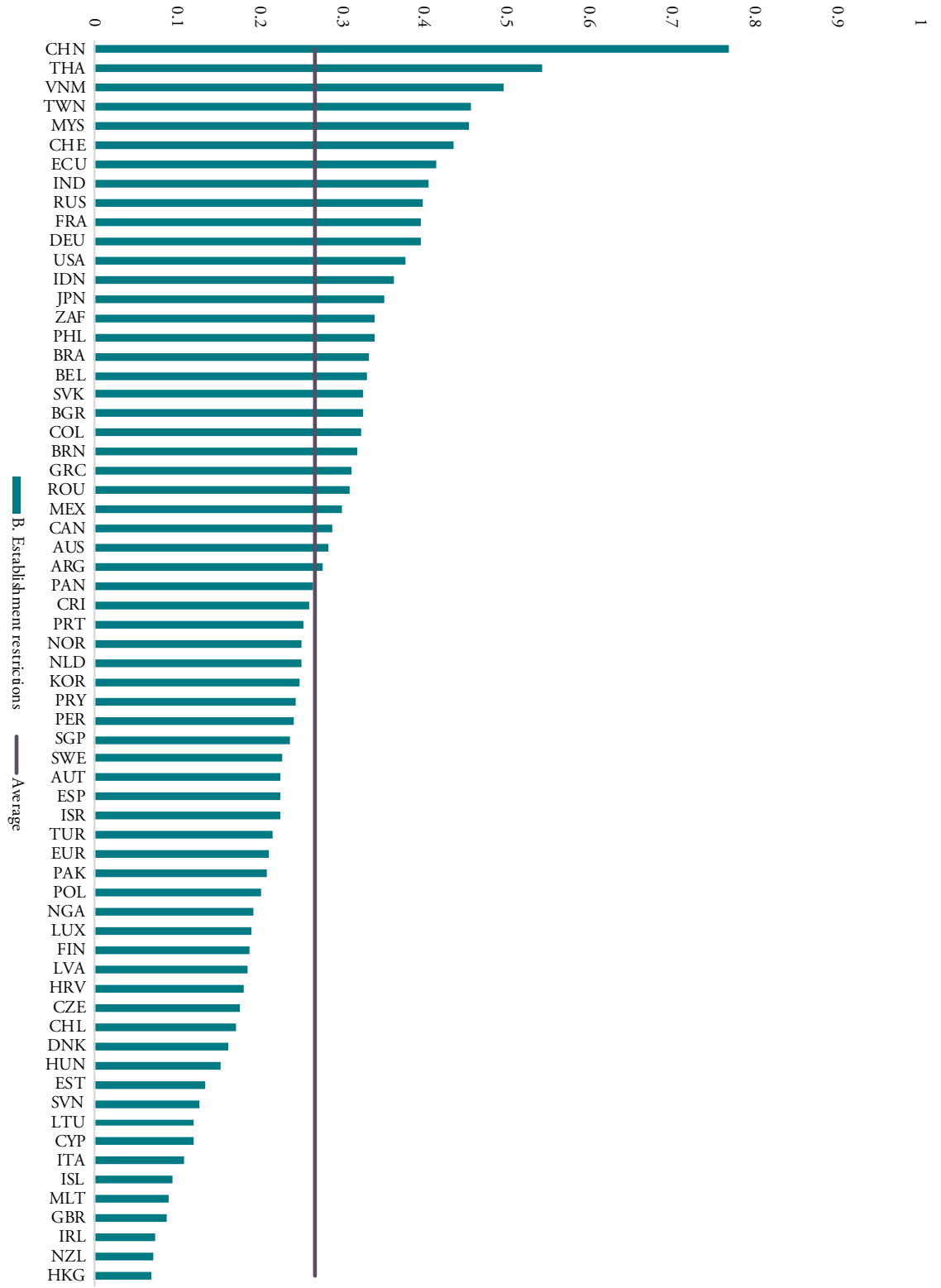



**Figure 2.2**: DTRI Cluster B - Establishment Restrictions

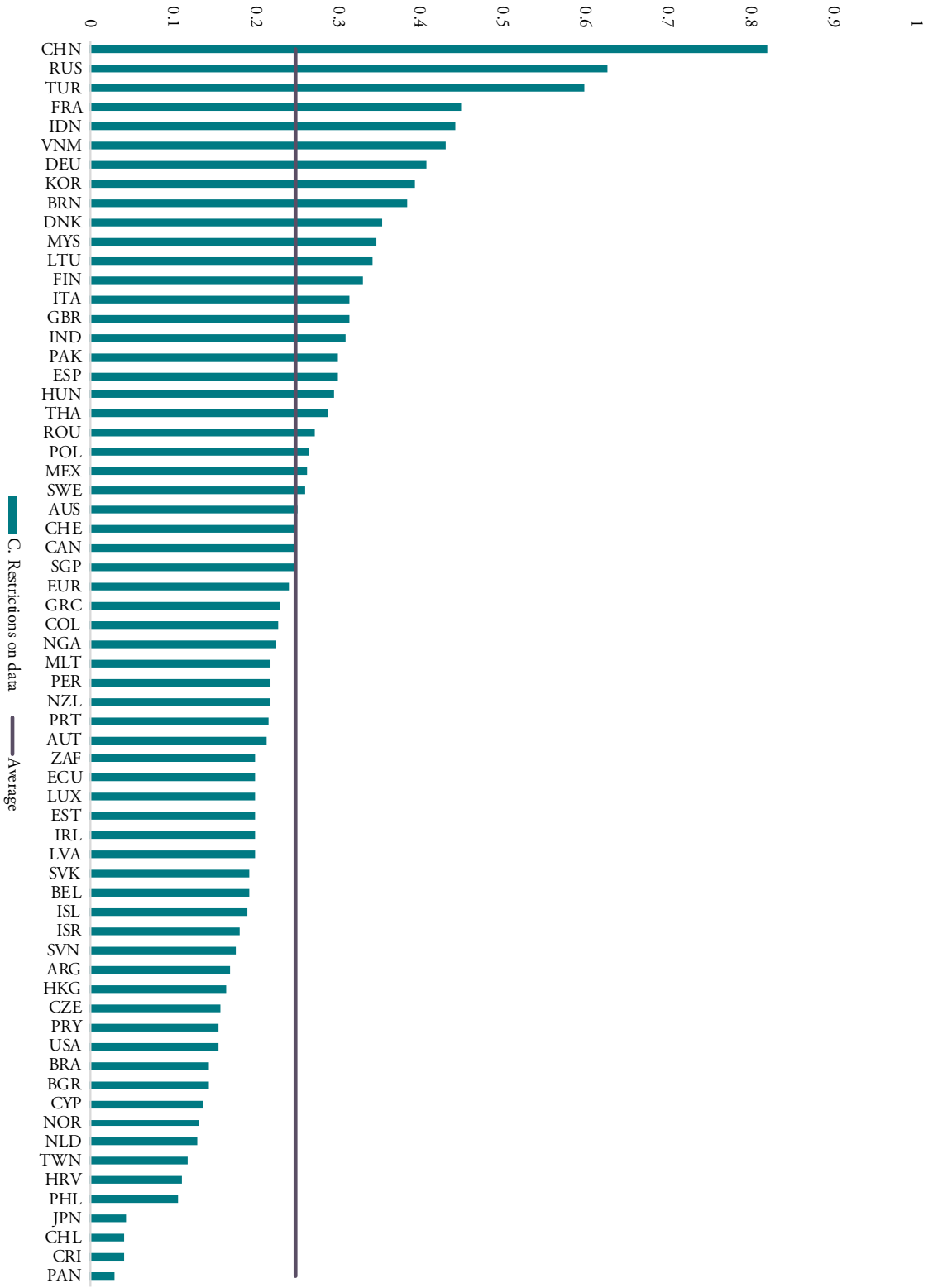



**Figure 2.3**: DTRI Cluster C - Restrictions on Data

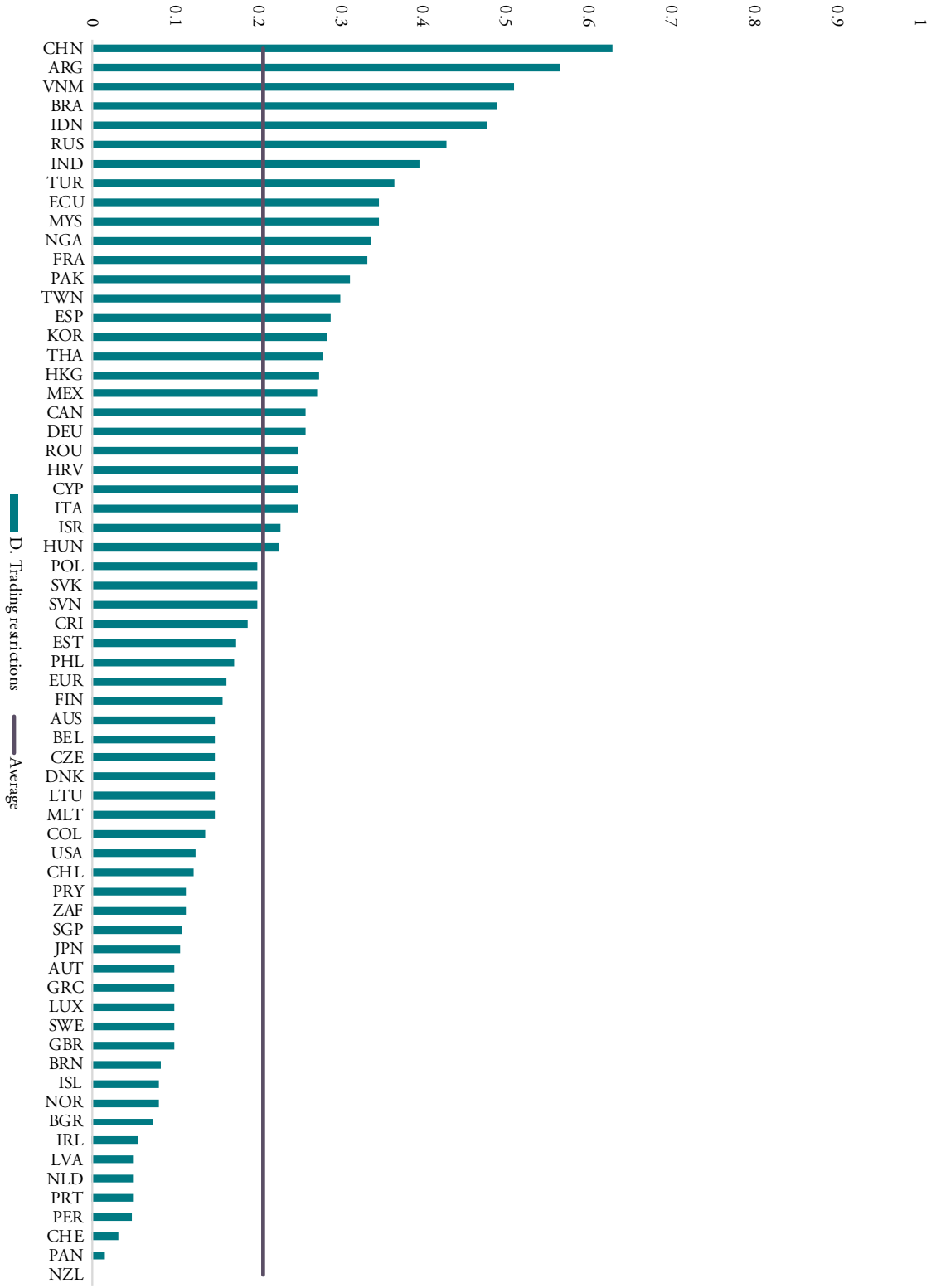



**Figure 2.4**: DTRI Cluster D - Trading Restrictions

**Box 2:** The DTRI and Economic Indicators

The DTRI consists of a score assigned to each country which summarises the country's overall policy framework with regards to digital trade.

Besides increasing transparency, the index uncovers policy patterns across countries in the global economy and provides a simple way of comparison between different countries. The DTRI ranges from 0 (i.e. completely open) to 1 (i.e. virtually restricted) with increasing values representing higher levels of digital trade costs for businesses.

Overall, the DTRI is negatively associated with the level of economic development, as illustrated in Figure B1. The figure shows the DTRI on the horizontal axis with the level of development displayed on the vertical axis. The figure clearly shows that higher levels of digital trade restrictiveness are particularly observable in countries which are economically less developed.

Moreover, the figure shows that some of the most restrictive economies in digital trade are also countries which have large markets, as indicated by the size of the circles. To put this in perspective, the Top 10 most restricted countries in digital trade according to the DTRI represents nearly half of the world population.

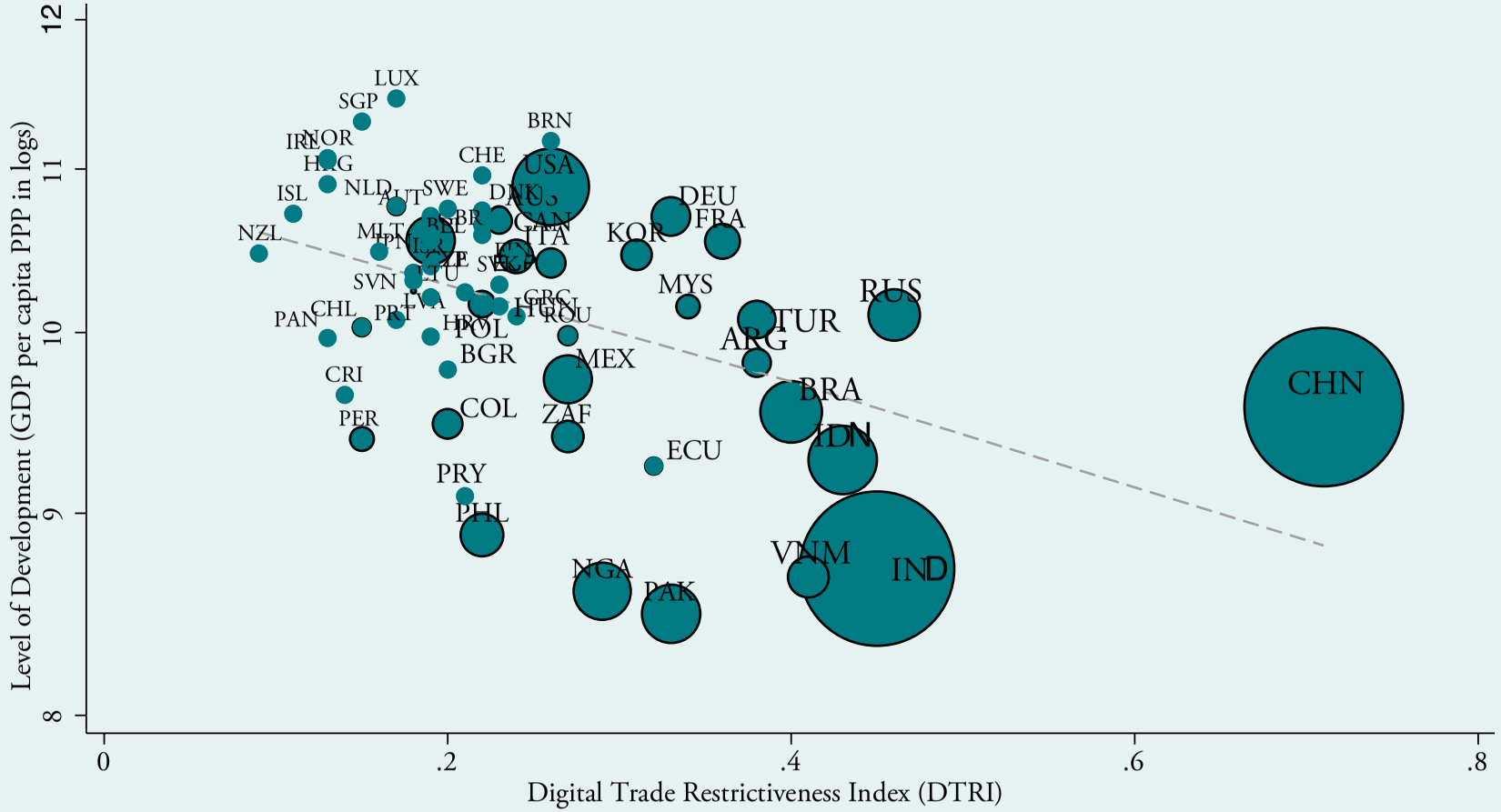
Besides the level of development, the DTRI is also found to be higher in countries with lower levels of Information and Communication Technology (ICT) and digital capacities. This can be seen in Figure B2 where each of the two panels shows a negative relationship between the DTRI and an indicator that proxies for the extent to which countries employ ICT, namely ICT-use (left-hand panel) and Technological Readiness (right-hand panel) sourced from the World Economic Forum (WEF). For example, countries such as Indonesia, India, Vietnam or Russia show low levels of technological readiness and ICT-use whilst at the same time applying many distortive digital trade measures.

Furthermore, when looking at the relationship between the DTRI and existing indexes that measure economic restrictiveness a positive correlation appears (Figure B3). Although these policy indexes measure restrictiveness in different parts of the economy, such as restrictions in product and services markets specifically, they are nonetheless expected to be associated. One important explanation is that countries which apply policy measures in one part of the economy are generally also likely to apply restrictive policies in other economic areas.

The left-hand panel of Figure B3 confirms such patterns of a positive link when using the OECD's PMR index, which measures a country's overall Product Market Regulations such as state controls, barriers to entrepreneurship and sector-specific domestic services regulations. Countries with higher levels of DTRI are also the ones with higher economy-wide regulations.

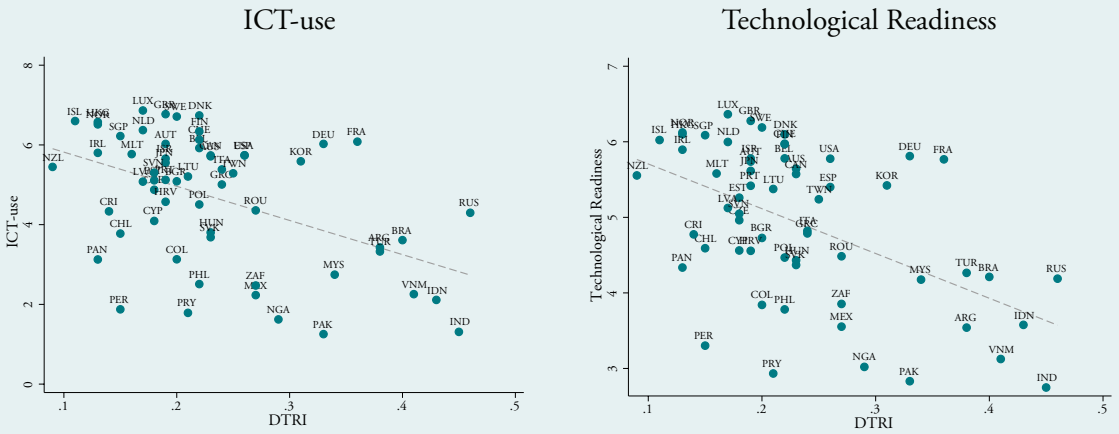
Similarly, the DTRI also relates well with another indicator of restrictiveness in digital trade presented by the United States International Trade Commission (USITC), i.e. in USITC (2014), which offers a ranking of digital trade barriers based on a survey of US firms (Figure B3, right-hand panel). The USITC indicator provides a sense of digital trade restrictiveness in terms of percentage of respondents to the survey that face digital trade restrictions in certain countries. Also, in this case, a positive relationship is found: countries with a high score on the DTRI are also assessed by the USITC's survey as more restrictive in digital trade.

**Figure B1:** DTRI and Level of Development



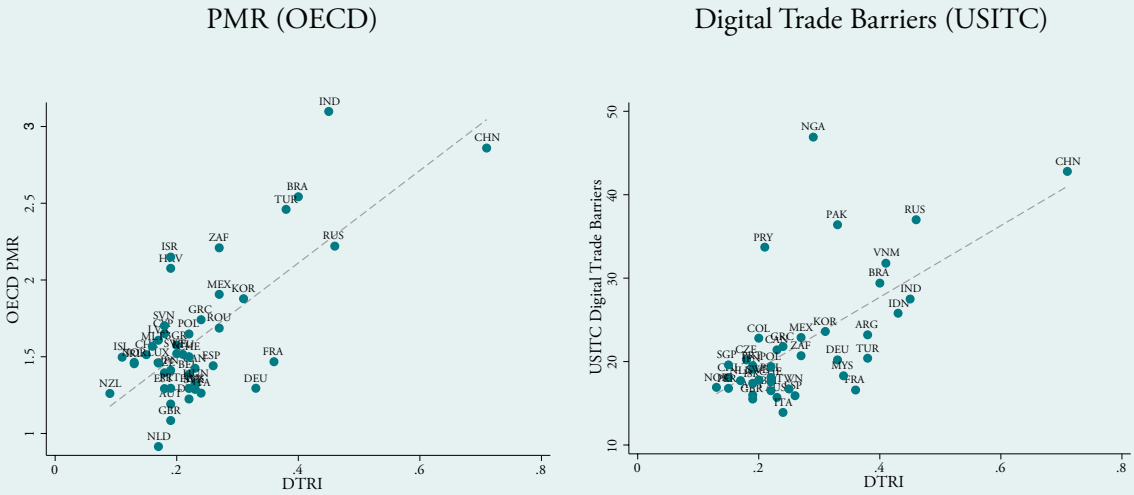

Note: The vertical axis plots the log of GDP per capita in Purchasing Power Parity (PPP) (in log scale) in 2016 which is a standard proxy that represents a country's level of development. The horizontal axis plots the overall DTRI score. The size of the circles for each country reflects the size of the market by taking population as a proxy. The dashed grey line running through the graph represents the downward sloping (i.e. negative) relationship between the level of development of economies and the overall DTRI score. In other words, the lower the level of development across all countries, the higher the restrictiveness of countries' digital trade policies. Country ISO 3-digit code belongs to each circle. GDP per capita PPP is sourced from World Development Indicators for the latest year available (2016).

**Figure B2:** DTRI and Level of Technology




Source: ECIPE and WEF; authors' calculations. China (CHN) is omitted because it forms an outlier.

**Figure B3**: DTRI and Other Restrictiveness Indicators




Source: ECIPE, OECD and USITC; authors' calculations. USITC digital trade barriers refers to Table 4.2 in USITC (2014).

# Chapter 3
# DTRI Results

This section of the report presents an in-depth analysis of the countries' rankings. We present a summary of the restrictions listed in the DTE database that justify the ranking of the most restricted countries in each chapter. In addition, for each chapter, we also present additional analyses of the most common measures and those measures which are considered to be more restrictive.

## 3.1 Cluster A: Fiscal Restrictions

Cluster A on Fiscal Restriction covers policy measures in three main chapters: Tariffs and Trade Defense, Taxation and Subsidies, and Public Procurement.

India ranks first in this cluster with a score of 0.63, despite not being at the top of the ranking in any of the three chapters that constitute the cluster (Table 3.1). Brazil and China rank 2nd and 3rd respectively in this cluster and are also large emerging economies. The United States is the only OECD economy among the Top 10 most restrictive countries in this first cluster.

In contrast, Hong Kong and Singapore have virtually no restrictions in this cluster with an overall score of 0.02. Other small open economies such as Norway, New Zealand, Iceland and Costa Rica also have very low scores in this cluster. The average level of restrictiveness across all countries for this cluster is 0.25, which is almost equivalent to the average of the full DTRI that is 0.24.

We turn now to present the country rankings for each of the three chapters and a summary of the regulations presented in the database that justify the position of the countries in the chapter rankings. We also highlight certain policy measures which are particularly relevant in the chapters and provide an overview of the implementation of such measures in different countries.

**Table 3.1**: DTRI Cluster A Score and Ranking, including Chapters 1-3

| | A. Fiscal Restrictions & Market Access | | Tariffs and Trade Defence | Taxation & Subsidies | Public Procurement |
|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** |
| **1** | **IND** | **0.63** | ARG | BRA | CHN |
| **2** | **BRA** | **0.62** | BRA | TUR | IND |
| **3** | **CHN** | **0.60** | PAK | ARG | ZAF |
| **4** | **ARG** | **0.49** | IND | CHN | IDN |
| **5** | **PAK** | **0.49** | NGA | PAK | USA |
| **6** | **IDN** | **0.43** | RUS | FRA | ECU |
| **7** | **ZAF** | **0.43** | BRN | IND | KOR |
| **8** | **NGA** | **0.41** | CHL | JPN | BRA |
| **9** | **RUS** | **0.40** | PRY | MEX | AUS |
| **10** | **USA** | **0.37** | CHN | NGA | GRC |
| **11** | **TUR** | **0.35** | PHL | CHL | MYS |
| **12** | **GRC** | **0.33** | THA | HUN | RUS |
| **13** | **KOR** | **0.33** | IDN | KOR | JPN |
| **14** | **PRY** | **0.32** | EUR | USA | TUR |
| **15** | **ECU** | **0.31** | AUT | RUS | NGA |
| **16** | **CHL** | **0.28** | BEL | CHE | PRY |
| **17** | **ITA** | **0.28** | BGR | COL | ITA |
| **18** | **THA** | **0.27** | HRV | CRI | GBR |
| **19** | **BRN** | **0.27** | CYP | ECU | BGR |
| **20** | **PHL** | **0.27** | CZE | AUT | ISR |
| **21** | **HUN** | **0.26** | DNK | BEL | PAK |

| | A. Fiscal Restrictions & Market Access | | Tariffs and Trade Defence | Taxation & Subsidies | Public Procurement |
|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** |
| **22** | **FRA** | **0.26** | EST | HRV | PAN |
| **23** | **GBR** | **0.25** | FIN | CZE | PHL |
| **24** | **AUS** | **0.25** | FRA | DEU | VNM |
| **25** | **MEX** | **0.24** | DEU | GRC | THA |
| **26** | **BGR** | **0.24** | GRC | ITA | MEX |
| **27** | **CZE** | **0.24** | HUN | LVA | ARG |
| **28** | **DEU** | **0.24** | IRL | LTU | BRN |
| **29** | **LVA** | **0.24** | ITA | NLD | CAN |
| **30** | **LTU** | **0.24** | LVA | POL | COL |
| **31** | **NLD** | **0.24** | LTU | ROU | CYP |
| **32** | **ROU** | **0.24** | LUX | SVK | CZE |
| **33** | **EUR** | **0.23** | MLT | ESP | DEU |
| **34** | **PRT** | **0.23** | NLD | SWE | HUN |
| **35** | **PAN** | **0.22** | POL | ISR | LVA |
| **36** | **VNM** | **0.22** | PRT | NOR | LTU |
| **37** | **CYP** | **0.21** | ROU | PRY | NLD |
| **38** | **SVN** | **0.21** | SVK | PER | PRT |
| **39** | **JPN** | **0.21** | SVN | ZAF | ROU |
| **40** | **AUT** | **0.21** | ESP | TWN | SVN |
| **41** | **BEL** | **0.21** | SWE | THA | PER |
| **42** | **HRV** | **0.21** | GBR | FIN | EUR |
| **43** | **POL** | **0.21** | TUR | EUR | CHL |
| **44** | **SVK** | **0.21** | PAN | CAN | CRI |
| **45** | **ESP** | **0.21** | ZAF | DNK | AUT |
| **46** | **SWE** | **0.21** | VNM | EST | BEL |
| **47** | **FIN** | **0.21** | ECU | PRT | HRV |
| **48** | **DNK** | **0.20** | KOR | IDN | DNK |
| **49** | **EST** | **0.20** | MEX | AUS | EST |
| **50** | **MYS** | **0.20** | CHE | BRN | FIN |
| **51** | **IRL** | **0.19** | USA | BGR | FRA |
| **52** | **LUX** | **0.19** | AUS | CYP | IRL |
| **53** | **MLT** | **0.19** | NZL | IRL | LUX |
| **54** | **CHE** | **0.17** | TWN | LUX | MLT |
| **55** | **ISR** | **0.13** | MYS | MLT | POL |
| **56** | **TWN** | **0.13** | ISL | SVN | SVK |
| **57** | **COL** | **0.12** | CAN | GBR | ESP |
| **58** | **PER** | **0.11** | COL | HKG | SWE |
| **59** | **CAN** | **0.10** | ISR | ISL | HKG |
| **60** | **ISL** | **0.09** | CRI | MYS | ISL |
| **61** | **CRI** | **0.09** | PER | NZL | NOR |

| | A. Fiscal Restrictions & Market Access | | Tariffs and Trade Defence | Taxation & Subsidies | Public Procurement |
|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** |
| **62** | **NZL** | **0.08** | JPN | PAN | SGP |
| **63** | **NOR** | **0.05** | HKG | PHL | CHE |
| **64** | **HKG** | **0.02** | NOR | SGP | TWN |
| **65** | **SGP** | **0.02** | SGP | VNM | NZL |

### 3.1.1 Chapter 1: Tariffs and Trade Defence

Although tariffs for digital goods have been reduced over the last decades - not least thanks to the WTO Information Technology Agreement (ITA) – a range of digital goods remain subject to trade restrictions. Even small tariffs impose a burden on the tradability of ICT goods and their inputs, especially in terms of the paperwork behind the payments. The DTRI therefore covers these measures under the fiscal restrictions' cluster.

In addition to tariffs applied on digital goods by each country,[1] this chapter also considers whether a country is a signatory to the WTO's ITA of 1996 and the ITA expansion of 2015 (hereafter ITA I and ITA II, respectively). Anti-dumping duties, countervailing duties and safeguard measures on digital goods also form part of this chapter.

Only three countries, Hong Kong, Norway and Singapore, have zero tariffs on digital goods and no trade defence measures targeting such goods. On the opposite side, the three countries with the highest scores are **Argentina**, **Brazil** and **Pakistan**. None of these countries have signed the WTO's ITA I and all three apply high tariffs whilst also having trade defence measures in place targeting digital goods.

**Argentina** ranks first in this chapter. It applies an average most-favored nation (MFN) tariff rate of 13.2 percent on digital goods, with peaks of 35 percent on certain goods. The country also has three anti-dumping measures in place, which are applied on electrical apparatus for making couplers from India, on liquid dielectric transformers from Brazil, China and South Korea and, finally, on electrical connection terminals from China and Germany. In addition, Argentina also holds a safeguard measure concerning imports of recordable compact discs from China and Hong Kong.

**Brazil** follows Argentina as the second most restrictive country in this chapter. The country applies an average MFN tariff rate on digital goods of 12.7 percent, with peaks of 30 percent on certain digital goods. In addition, three anti-dumping measures are applied on polycarbonate resins from Thailand (although the duties were suspended in December 2015), on wire of steel coated with zinc (such as those used as guy, messengers and span wires) from Sweden, and on loud-speakers from China.

The third country in the ranking of this chapter is **Pakistan**, which applies an average MFN tariff rate of 10.2 percent on digital products, with peaks of 35 percent. The country also has an anti-dumping measure in place on imports of phthalic anhydride from India, Iran, Italy, Thailand, Brazil, China, Indonesia, Republic of Korea and Hong Kong. Furthermore, Pakistan does not apply its MFN tariff rates on imports from India.

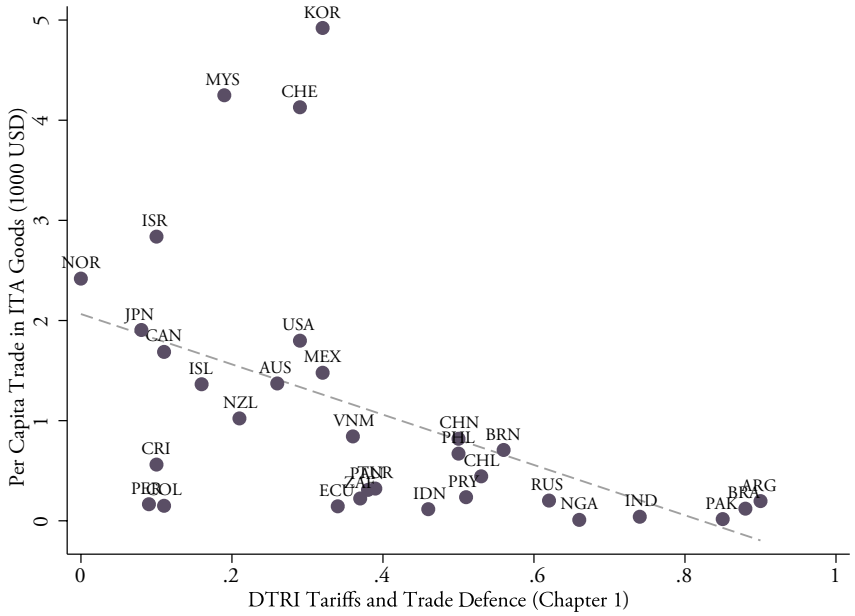
The index score of Chapter 1 is found to be higher in countries with low levels of trade in digital goods. This can be seen in Figure 3.1 which plots the relationship between the index score for this chapter on the horizontal axis and the per capita trade (i.e. imports and exports) of digital goods on the vertical axis.

The figure shows a clear negative relationship which means that countries with greater levels of restrictions in digital tariffs and trade defence also have lower levels of trade in ITA goods.[2]

[1] The list of digital goods used for the analysis follows the expanded classification list of ITA goods from Lee-Makiyama (2011), as explained in detail in Section 4.

[2] The per capita trade of ITA goods is the sum of exports and imports for each country divided by the population for that country. Per capita trade provides an improved and undistorted measure of the extent to which countries export and import ITA goods rather than picking up country size alone as larger countries are likely to have higher nominal values of trade. Also, notice that both Singapore and Hong-Kong have been taken out the sample because of their extreme values which makes them large outliers. Malaysia, Switzerland and South Korea are also big traders in ITA goods although to a much lesser extent than the two aforementioned entrepôt economies.

**Figure 3.1**: DTRI Chapter 1 Index Score and Trade in ITA Goods (2015)

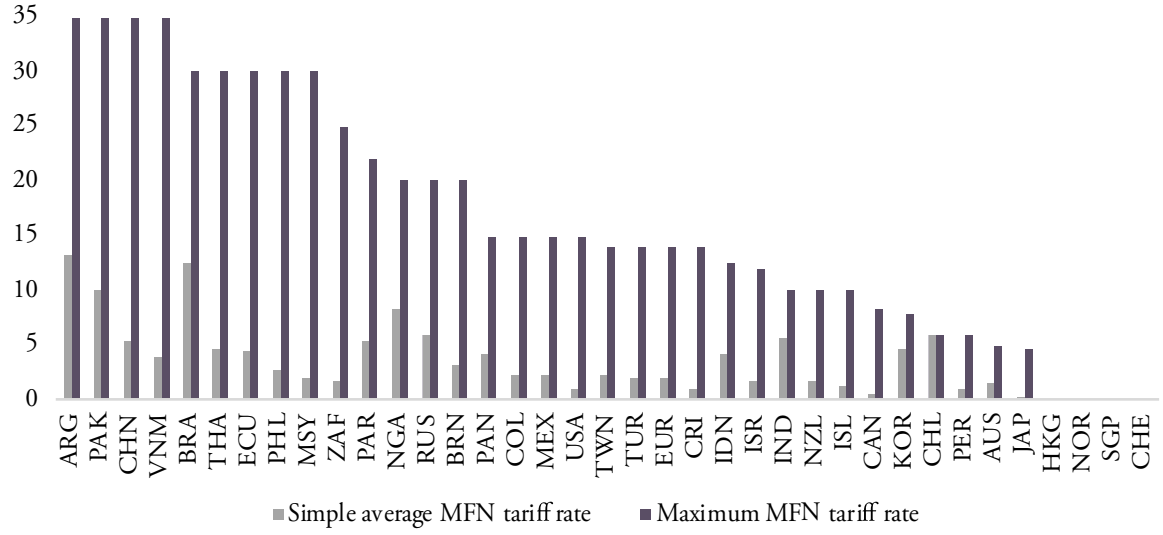



Source: ECIPE, WITS and World Bank WDI; authors' calculations. Note that Singapore (SGP) and Hong-Kong (HKG) are excluded. See footnote 2.

## TARIFF RATES APPLIED ON ICT GOODS AND THEIR INPUTS

The tariff rates applied on ICT goods and their inputs make up for the main part of the scoring in this chapter. The highest maximum tariff rates on ICT goods and their inputs, as well as the highest average MFN tariffs on these products, are found in Latin American and Asian countries (Figure 3.2). As noted above, the three countries which apply the highest average tariff rate on ICT goods and their inputs are Argentina, Brazil, and Pakistan. On the other hand, the highest maximum tariff rate on these products of 35 percent is applied by Argentina, China, Pakistan, and Vietnam.

**Figure 3.2**: Simple Average and Maximum Applied MFN Tariffs on ICT Goods and their Inputs




Source: ECIPE and UNCTAD Trains Database (latest available tariff years at the time of download: 2011-2014).

For India and Pakistan further restrictive tariff practices were found. For example, in India, the Notification 11/2014-Customs stipulates a 10 percent tariff increase for certain telecommunication equipment and allegedly the Notification uses evolving technologies as the determining factor to identify products as not being covered by the WTO's ITA I. The second case is found in Pakistan, which does not grant MFN status to India.

## TRADE DEFENCE MEASURES

In contrast to the widespread use of tariff measures, trade defence measures are applied by only 13 countries. The primary reason for this result is that trade defence measures can be implemented only in specific cases to protect domestic producers from international trade distortions. Most of the trade defence measures affecting trade in digital goods are anti-dumping measures and in total 28 measures were found. Furthermore, one safeguard measure was found which is applied by Argentina, whilst no countervailing duties on ICT goods and their inputs were found.

The countries with the highest number of trade defence measures are the BRICS countries (with the exception of Russia), as well as two developed economies which are US and Australia, and two major South American countries, namely Argentina and Mexico. In particular, the countries that implemented the highest number of measures are India (eight measures), Argentina (four measures) and Brazil (three measures).

## ITA I AND ITA II

In addition to tariffs and trade defence measures, the DTE database covers information on whether countries are signatories to the ITA I and ITA II. The WTO's ITA requires participants to eliminate and bind customs duties at zero on an MFN basis for a list of specified digital goods. In 2015, some of the signatories agreed to expand the product coverage of the agreement. Of the 36 economies included in the database outside EU countries (which are counted as one regarding WTO agreements), 25 economies have signed the ITA I agreement whereas 20 economies have signed the ITA II agreement at the Nairobi Ministerial Conference.

### 3.1.2 Chapter 2: Taxation and Subsidies

The issue of policies on taxation and subsidies is a sensitive topic for many countries. This is mainly due to countries' sovereignty in matters of legislating taxation practices and principles within their own national borders. At the same time, as firms have become increasingly global, taxation principles and procedures are also becoming a matter of contention on the international stage.

In this chapter, we present restrictions related to taxation of digital goods and products, digital services and data usage. In addition, the chapter covers cases of discriminatory implementation of subsidies schemes. The findings are assessed on the basis of guidelines provided by the OECD GST/VAT practice and of tax standards from the main global accounting and consulting firms.

The overall picture that emerges from the database is that a noticeable group of leading emerging markets are most restrictive, particularly in the areas of discriminatory tax regimes on either digital goods and/or services. The average scoring for this chapter across all countries is 0.13, with only one country, namely **Brazil**, scoring above 0.50. After Brazil, the most restricted countries regarding taxation and subsidies in digital trade are **Turkey** and **Argentina**. Moreover, the Top 10 countries in terms of restrictiveness are all emerging economies with the exception of France and Japan which rank sixth and eighth respectively.

In contrast, the countries that are deemed as most open in this chapter include a handful of EU member states, a number of countries within the Asian-Pacific region and one country in Latin America. As many as 17 countries in the database have a score equal to 0. Discriminatory tax practices are geographically spread across all countries and not restricted only to emerging and developing countries.

As mentioned above, **Brazil** is the country with the highest score in this chapter as a result of high levels of taxation for digital goods and services. Generally, the Brazilian tax system is reported to be complex and burdensome, and even more so for foreign digital goods. Not only does Brazil report over 300 different tax categories for goods and services, its taxes also differ across various states. It is reported that some Brazilian goods have a tax advantage of around 50 percent over their imported counterparts, encouraging companies to produce PCs locally. For instance, VAT rates apply differently. There is a 15 percent VAT on finished imported PCs, while locally produced PCs are subject to 0.75 percent.

Furthermore, Brazil offers a 95 percent reduction in the VAT to PCs and tablets produced in accordance with the Basic Production Process (PPB), which requires that certain components are sourced from local manufacturers. Certain measures concerning goods produced in Free Trade Zones, taxation and charges in the electronics and technology industry as well as tax advantages for exporters in Brazil are also currently being challenged at the Panel's stage at the WTO.

For what concerns online services, it is reported that Brazil has a situation for which the tax on online sales is possibly being paid twice and companies report that there is a lack of guidance on how to determine which taxes apply to cross-border payments for software and cloud computing, among other services. It is also reported that many Brazilian states require that tax declarations of online sales must be performed online in real-time, leading foreign firms to establish a local subsidiary in Brazil.

Moreover, Video On Demand (VOD) is subject to a special contribution under the CONDECINE scheme (the Contribution to the Development of the National Film Industry). The fee is due at a fixed amount once in five years. Under the CONDECINE scheme, each movie must pay 3,000 Reals (which is approximately USD 1,258), while each episode of any TV series must pay 750 Reals (approximately USD 314).

**Turkey** is the second most restricted country when it comes to digital taxation policies. The country has copyright levies on blank media, including computer discs, CDs, DVDs and other technical equipment. Moreover, in addition to VAT, Turkey has a 25 percent tax on the sale of handsets and a fixed fee of approximately USD 24 on SIM card sales, as well as a 25 percent excise tax on calls and SMS. Turkey is also one of the few countries in our sample that has a tax on data usage, which is stated at 5 percent.

Two years ago, the Turkish Minister of Finance announced the intention to impose VAT on non-resident internet companies by introducing the concept of an "electronic taxpayer" to Turkey's Tax Procedure Law. A specific primary objective of the proposals was to collect taxes from social network platforms and from non-resident entities generating income from online advertisements targeted at Turkish consumers. The proposal eventually became a law at the beginning of this year and requires foreign providers of digital services to Turkish consumers to VAT register and charge Turkish VAT.

With copyright levies and restrictions related to the taxation of both of digital products and services, **Argentina** ranks third in the taxation policies chapter. Although Argentina's copyright law allows for private copying of music works in videograms such as DVDs, a regular copyright levy needs to be paid for this item by any "individual" who makes the copy to compensate the right-holder. The fee is a fixed percentage of a number estimated through a formula that takes into account the length of the music work, the total length of the videogram, the number of copies the individual makes and, finally, the sales price given by the producer.

Argentina also has a regime of higher VAT for mobile devices of 27 percent compared with the standard VAT of 21 percent. Moreover, mobile devices are also subject to an additional special tax of 20.5 percent. In addition, Argentina's capital city Buenos Aires imposed the so-called "Netflix tax" which results in a price increase of the service of approximately USD 0.5 per subscription. The local tax is intended to compensate cable providers in Argentina, which have been complaining against the unfavorable conditions to compete against over-the-top (OTT) operators and telecommunication companies.

Argentina also holds an extra tax of 50 percent of the value of the product applied to online purchases of foreign products up to USD 3,000 and which are delivered through Argentina's official postal service (EMS). Once per year, individuals may import goods of a value up to USD 25 duty-free, but total mail order transactions via EMS are limited to two per year per individual.

### COPYRIGHT LEVIES

Copyright levies are government-mandated taxes charged on purchases of recordable media and other devices. Such schemes have often been criticised as the purchase of media and devices is not necessarily linked to private copying and might result in double taxation. For example, a copyright levy might be applied to the purchase of a computer even if the user is not using the computer for the private copying of copyrighted material.

The most restrictive cases of copyright levies are those in which they are applied on devices. Countries which impose levies on devices are Japan, Paraguay, Peru, Russia, United States and several countries in the EU. In fact, the EU allows Member States to have a private copyright levy system that collects revenues from levies on blank media and certain devices with storage capacity and distributes them to rights holders of creative works. These revenues are intended to provide "fair compensation" to rights holders (as mentioned in the EU Copyright Directive 2001/29/EC) as a result of authorised private copying. There are as many as 18 Member States making use of the regime to implement copyright levies not only on blank media, but also on devices. These are Austria, Belgium, Croatia, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, the Netherlands, Poland, Romania, Slovakia, Spain, and Sweden. It is also reported that Slovenia has copyright levies, but they have not been charged since 2010.

Less restrictive cases are those in which the levies are applied on blank media. The countries in our dataset that implement such taxes are Argentina, Canada, Denmark, Estonia, Portugal, Switzerland, and Turkey.

### TAXATION ON DATA USAGE

Taxation on data usage is particularly problematic for digital trade as it might deter users from accessing any digital content. Only three countries in our dataset impose such measures. They are Nigeria, Pakistan, and Turkey. In particular, in Nigeria, there is an additional 2 percent VAT applied to data services on

top of the standard rate of 5 percent. In Pakistan, data usage is subject to Provincial Sales Tax (PST) and the Federal Excise Duty (FED) at a rate of 19.5 percent and 18.5 percent respectively. An additional 14 percent ad valorem tax on usage applies to all mobile services. The resulting total burden from ad valorem taxes is up to 33.5 percent, of which up to 6.5 percent is mobile-specific. Finally, Turkey also applies a 5 percent tax on data usage.

## SUBSIDIES

There are three countries in our dataset that are reported to implement fiscal subsidies in a discriminatory manner. These are China, Indonesia, and Russia. Regarding China, it is reported that foreign companies cannot benefit from the export credit scheme at the China Exim Bank or Sinosure, which therefore only covers Chinese companies. However, foreign companies can benefit from this scheme if they are part of a joint venture in China. In Indonesia, it is found that export financing is granted only to domestic companies. Finally, in Russia, the Supreme Arbitration Court published a ruling in January 2012 that prohibits taxpayers with foreign capital to deduct interest that they pay on loans "with a foreign element". These include: loans provided by a foreign legal entity which directly or indirectly owns more than 20 percent of the Russian entity financed; loans provided to a Russian entity which is an affiliated party of a foreign entity which, directly or indirectly, owns more than 20 percent of the Russian entity financed; and finally, loans to a Russian entity in respect of which a foreign entity, which directly or indirectly owns more than 20 percent of the entity financed, or its Russian affiliate, issues a guarantee, acting as surety or otherwise securing the fulfillment of the debt obligation.

### 3.1.3 Chapter 3: Public Procurement

Limitations to participate in public procurement can constitute a significant restriction for digital trade, especially considering that, in certain economies, public procurement markets cover up to 15 percent of GDP. The measures identified in the database take different forms and vary from general preferential purchasing schemes to more specific measures such as the requirements to surrender patents and source codes and measures mandating the use of certain technologies. Note that many of the policies and practices regarding public procurement listed in the DTE database are horizontal measures and apply across all sectors, or to several products and services sectors, including digital products and services.

**China**, **India** and **South Africa** are the three countries that implement the most trade-restrictive regimes in public procurement markets.

Overall, the results indicate that the BRICS countries impose the most restrictive measures on digital trade in goods and services in the public procurement market. With the exception of Mexico, the BRICS and MINT countries (which are Mexico, Indonesia, Nigeria, Turkey) all feature in the Top 15 countries in terms of restrictiveness of their public procurement practices. Other large developed economies that are among the 15 most restrictive countries are Australia, Japan, South Korea, and the United States. In contrast, several European economies appear quite open in relation to public procurement, while New Zealand is the only country with a score equal to 0.

**China** has various restrictive measures in place regarding public procurement and therefore it tops the scoring list for this chapter. The country has three measures in place that ban foreign providers from public procurement of antivirus software, Windows 8 and certain foreign IT products such as selected Apple products. In addition, the Multi-Level Protection Scheme (MLPS) introduced by the Ministry of Public Security mandates that all IT systems in China classified as "critical infrastructure" are prohibited from purchasing foreign IT products.

Furthermore, China also has measures in place that require the disclosure of product source codes and encryption keys in order to participate in public procurement. The MLPS requires that systems of a certain security level must solely contain products developed by Chinese information security companies and their key components must bear Chinese intellectual property. Companies making systems for critical infrastructure must disclose product source codes as well as encryption keys.

The Directive Number 618 sets out a directory of accredited products (including computers and application equipment, communications products and software) that are eligible for government procurement contracts. However, the criteria to gain accreditation are reported to be strict and to strongly favour the use of Chinese products. Additionally, an active 'Buy Chinese' policy is included in the Chinese public procurement regulatory framework, which stipulates that foreign companies are only allowed to bid in public tenders under certain exceptions.

**India** does not apply an explicit ban on public procurement but has several restrictive measures in place. Its Preferential Market Access (PMA) policy provides that domestically manufactured equipment receives preferences in government procurement and in some types of private sector procurement. The underlying objectives are India's goals to expand its domestic manufacturing capacity and to protect the security of its telecommunications networks. India revised the PMA in December 2013, but the revised policy still requires that domestically manufactured goods constitute a certain percentage of the electronic products procured by government entities. The electronic products for which it is provided to give preference to domestic manufacturers include desktop PCs, dot matrix printers, tablet PCs, laptop PCs, contact smart cards, contactless smart cards, LED products, biometric access control/authentication devices, biometric fingerprint sensors, and biometric iris sensors.

The preferential access for domestically manufactured specified IT products ranges from 50 percent to 100 percent, while the percentage value addition required for the products to be classified as domestically manufactured ranges from 25 percent to 45 percent. Both PMA and value-added requirements increase

every year. In addition, India's National Telecom Policy 2012 gives preference to domestically manufactured products in procurements of telecommunication products that have security implications for the country.

**South Africa** ranks third in terms of restrictiveness of digital public procurement policies. Its Local Procurement Accord (LPA) of 2011 stipulates that the procurement in selected sectors where local production and content is deemed "of critical importance" must be restricted to local producers. These include products such as set-top boxes for digital TVs and telecom cables. Furthermore, the LPA states that the government commits to significantly expand the value of goods and services it procures from South African suppliers. In addition, South Africa's Industrial Policy Action Plan contains numerous pledges to strengthen localisation of products and sectors, for example in the electronics industry.

### BAN ON PARTICIPATION IN PUBLIC PROCUREMENT

The most problematic measures in terms of their trade restrictiveness in this chapter are complete or almost complete bans on participation in public procurement. These measures usually stipulate very restrictive conditions on the participation of foreign suppliers in tenders. When such measures apply, foreign companies can be considered for public procurement only when no domestic service suppliers are participating in the procurement, when goods or services are not available locally, or when they bid in cooperation with a national company. About half of the measures found in this category are horizontal and therefore apply to all products or services. The rest of the measures reported in this chapter are product or sector specific. They apply, for instance, to software, other digital products, network equipment and IT systems. Complete or almost complete bans have only been found for China, Indonesia, Malaysia, Paraguay, Russia, South Africa, the United States, and Vietnam.

### TECHNOLOGY MANDATE

Other measures that pose significant difficulties for firms in the digital sectors to participate in public tenders are those that mandate specific technologies or standards. China and India are the only two countries in the database requiring the company to surrender patents or source codes in order to participate in public procurement.

### PREFERENTIAL PURCHASING SCHEMES

Approximately 20 percent of the measures in this chapter stipulate a preferential purchasing scheme by setting out price preferences for goods and services produced domestically or for goods and services that incorporate domestic components or professional, technical and operating services. The preference margin usually goes up to 25 percent, except in the case of Paraguay where the domestic preference margins for national industrial or manufactured products can even be as high as 40 percent. Other restrictions to participate in public tenders include complicated and lengthy tendering procedures, lack of transparency, and selective tenders which are only for locally registered companies. There are also requirements to form a joint venture with a local company or to register and have a local legal representative in place in order to participate in government tenders.

## LOCAL CONTENT REQUIREMENTS

About 17 percent of the measures affecting public procurement markets are local content requirements (LCRs). Most of these measures are sector or product-specific and target the ICT sector or the electronics sector, but also specifically network and IT products or software. Several of these measures require the public sector to purchase goods, products, equipment and systems for telecommunications, and data networks with national technology. Alternatively, the local content requirement can go further and can contain an obligation to purchase only domestic IT products, or to source and procure software only from local and indigenous software development companies. Other examples of LCR measures require the bidder to meet specific milestones over time to ensure local content of the infrastructure installed to supply the licensed service, which includes software. In some cases, it is required more generally to utilise local resources such as engineering services, manpower supplies, manufacturing or assembly.

## 3.2 Cluster B: Establishment Restrictions

The cluster Establishment Restrictions covers policy measures in four main areas: Foreign Investment Restrictions, IPRs, Competition Policy, and Business Mobility.

China ranks first in this cluster with a score of 0.77 which is well above the other countries (Table 3.2). The country ranks first in all chapters of this cluster except the one covering business mobility.

The two other countries with a score above 0.50 are Thailand, and Vietnam. Switzerland and France are the only OECD countries among the Top 10 most restrictive countries when it comes to establishment restrictions.

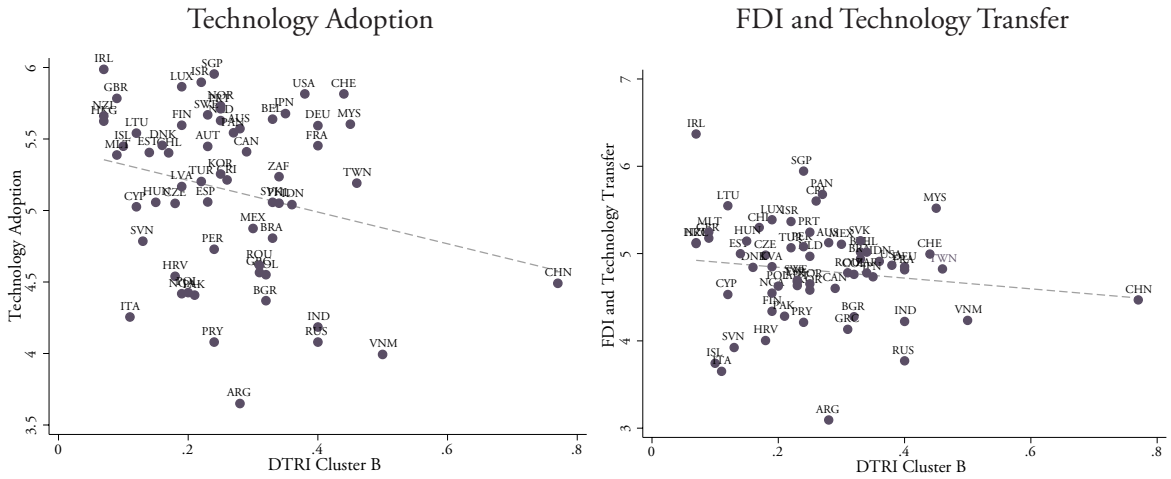
There are six countries in this cluster with a score lower than 0.10. These are, in order from the least restrictive, New Zealand, Hong Kong, Ireland, the United Kingdom, Malta, and Iceland. The average level of restrictiveness in this cluster is 0.27, which is slightly higher than the average of the overall DTRI which is 0.24.

Establishment restrictions in digital trade are likely to cause strong negative consequences on the extent to which countries can take advantage of new foreign technologies. In fact, these measures hamper spill-over effects and the adoption of foreign technologies by domestic companies. This adverse pattern is confirmed in Figure 3.3.

The figure plots the relationship between the DTRI for this cluster of Establishment Restrictions on the horizontal axis whilst showing on the vertical axis an indicator measuring the ability of countries to adopt existing technologies (left-hand panel) and the ability to profit from technology transfer through Foreign Direct Investment (FDI) (right-hand panel).[3]

Both panels show a negative relationship. This means that countries with higher levels of establishment restrictions in the digital economy are less likely to reap the benefits provided by the latest technologies and in addition are less likely to exploit economic benefits from spill-overs effects through FDI from international companies.[4]

**Figure 3.3**: DTRI Cluster B Index Score and Technology Adoption incl. FDI and Technology Transfer




Source: ECIPE and WEF; authors' calculations.

[3] Both indicators are taken from the WEF. In particular, these two indicators are the overall pillar index of Technology Adoption in the WEF's Global Competitiveness Report.

[4] Note that similar to the overall DTRI, China appears to be a clear outlier with respect to Establishment Restrictions taken up in this Cluster B. Therefore, one can ask whether the negative correlation holds when China is taken out of these two figures. Taking out China does not alter the adverse relationship between the index score of Cluster B and the two technology variables.

We turn now to present the country rankings for each of the four chapters and a summary of the regulations presented in the database that justify the position of the countries in the chapter rankings. We also highlight certain policy measures which are particularly relevant in the chapters and provide an overview of the implementation of such measures in different countries.

**Table 3.2**: DTRI Cluster B Score and Ranking, including Chapters 4-7

| | B. Establishment Restrictions | | Foreign Investment | IPR | Competition Policy | Business Mobility |
|---|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** | **Country** |
| **1** | **CHN** | **0.77** | CHN | CHN | CHN | ROU |
| **2** | **THA** | **0.54** | CAN | ESP | ZAF | RUS |
| **3** | **VNM** | **0.50** | THA | ARG | SVK | PAN |
| **4** | **TWN** | **0.46** | AUS | ECU | FRA | BRN |
| **5** | **MYS** | **0.45** | IND | NLD | DEU | SGP |
| **6** | **CHE** | **0.44** | TWN | PER | MYS | CHE |
| **7** | **ECU** | **0.42** | PHL | THA | THA | ZAF |
| **8** | **IND** | **0.40** | RUS | IND | VNM | HRV |
| **9** | **RUS** | **0.40** | JPN | TWN | USA | BGR |
| **10** | **FRA** | **0.40** | VNM | IDN | COL | PHL |
| **11** | **DEU** | **0.40** | KOR | HRV | MEX | AUT |
| **12** | **USA** | **0.38** | IDN | DEU | BGR | GRC |
| **13** | **IDN** | **0.36** | USA | BGR | CRI | EST |
| **14** | **JPN** | **0.35** | CHE | HUN | ECU | TWN |
| **15** | **ZAF** | **0.34** | BRA | POL | LUX | PRT |
| **16** | **PHL** | **0.34** | MYS | RUS | SWE | HUN |
| **17** | **BRA** | **0.33** | ECU | CHE | PAK | PER |
| **18** | **BEL** | **0.33** | NOR | VNM | PAN | VNM |
| **19** | **SVK** | **0.33** | BEL | BRN | CHE | IND |
| **20** | **BGR** | **0.32** | BRN | PRY | TWN | AUS |
| **21** | **COL** | **0.32** | ISR | AUT | GRC | BRA |
| **22** | **BRN** | **0.32** | FRA | GRC | PRT | FRA |
| **23** | **GRC** | **0.31** | FIN | LTU | ROU | IDN |
| **24** | **ROU** | **0.31** | SGP | JPN | BEL | MYS |
| **25** | **MEX** | **0.30** | NGA | COL | PRY | NGA |
| **26** | **CAN** | **0.29** | TUR | CRI | BRA | THA |
| **27** | **AUS** | **0.28** | DEU | CZE | ARG | TUR |
| **28** | **ARG** | **0.28** | ARG | EST | CZE | JPN |
| **29** | **PAN** | **0.27** | GRC | LVA | EUR | PAK |
| **30** | **CRI** | **0.26** | COL | MLT | CHL | CHN |
| **31** | **PRT** | **0.25** | CRI | PRT | DNK | BEL |
| **32** | **NOR** | **0.25** | MEX | ROU | NLD | ISL |
| **33** | **NLD** | **0.25** | CHL | SVK | POL | ISR |
| **34** | **KOR** | **0.25** | DNK | MEX | ESP | SVN |

| | B. Establishment Restrictions | | Foreign Investment | IPR | Competition Policy | Business Mobility |
|---|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** | **Country** |
| **35** | **PRY** | **0.24** | LVA | NOR | ISR | COL |
| **36** | **PER** | **0.24** | PAN | KOR | JPN | ECU |
| **37** | **SGP** | **0.24** | SWE | EUR | PER | MEX |
| **38** | **SWE** | **0.23** | PRY | FRA | PHL | CHL |
| **39** | **AUT** | **0.23** | NZL | BRA | TUR | EUR |
| **40** | **ESP** | **0.23** | NLD | CAN | BRN | GBR |
| **41** | **ISR** | **0.22** | AUT | MYS | AUT | CAN |
| **42** | **TUR** | **0.22** | ITA | BEL | CYP | DEU |
| **43** | **EUR** | **0.21** | GBR | ITA | LVA | LTU |
| **44** | **PAK** | **0.21** | SVK | SWE | SVN | NLD |
| **45** | **POL** | **0.20** | ISL | AUS | IND | POL |
| **46** | **NGA** | **0.19** | EUR | ZAF | IDN | USA |
| **47** | **LUX** | **0.19** | BGR | HKG | NOR | LUX |
| **48** | **FIN** | **0.19** | IRL | PAK | RUS | ESP |
| **49** | **LVA** | **0.19** | ROU | CYP | SGP | CYP |
| **50** | **HRV** | **0.18** | ZAF | DNK | FIN | DNK |
| **51** | **CZE** | **0.18** | HRV | FIN | NGA | FIN |
| **52** | **CHL** | **0.17** | CYP | LUX | AUS | IRL |
| **53** | **DNK** | **0.16** | CZE | ISR | CAN | ITA |
| **54** | **HUN** | **0.15** | EST | PHL | HRV | LVA |
| **55** | **EST** | **0.14** | HUN | TUR | EST | SVK |
| **56** | **SVN** | **0.13** | LTU | CHL | HUN | HKG |
| **57** | **LTU** | **0.12** | LUX | IRL | IRL | ARG |
| **58** | **CYP** | **0.12** | MLT | SVN | ITA | CRI |
| **59** | **ITA** | **0.11** | POL | GBR | LTU | KOR |
| **60** | **ISL** | **0.10** | PRT | ISL | MLT | CZE |
| **61** | **MLT** | **0.09** | SVN | PAN | GBR | NZL |
| **62** | **GBR** | **0.09** | ESP | SGP | HKG | MLT |
| **63** | **IRL** | **0.07** | HKG | USA | ISL | SWE |
| **64** | **NZL** | **0.07** | PAK | NZL | KOR | NOR |
| **65** | **HKG** | **0.07** | PER | NGA | NZL | PRY |

### 3.2.1 Chapter 4: Investment

Digital trade relies heavily on investment in the telecommunication sector, computer services, internet publishing services and manufacturing of digital goods, among other sectors. Restrictions on ownership, national and residency requirements for directors and managers, investment screenings and similar measures are therefore included in the database.

While 15 countries in our sample are totally open to digital-related investment, there are 11 countries with a score above 0.50 meaning they have significant restrictions in place. Among them, there are a mix of developed countries (including Australia, Canada, Japan, and Korea) and developing countries (China, India, the Philippines, Russia, Taiwan, Thailand, and Vietnam). The Top Three countries in terms of restrictiveness are **China**, **Canada**, and **Thailand**.

In **China**, stringent limitations apply to foreign investment in basic telecommunication services, value-added telecommunication services and internet publishing, as indicated in the Catalogue for the Guidance of Foreign Investment Industries amended in 2015. Additionally, the country has certain requirements in place for companies to engage in joint ventures in order to operate as a foreign-invested telecommunications enterprise. The joint venture should be pre-approved by the Ministry of Industry and Information and approved by the Ministry of Commerce.

China also implements several investment screening mechanisms, such as the requirement to show net economic benefits in order to invest, the subordination of the approval to national security screening in case of mergers and acquisitions, and a general notification and clearance regime for transactions involving sensitive or strategic sectors. This notification provides inter-ministerial bodies with the power to block the proposed transactions on national security grounds. Finally, licenses are required for the provision of all telecom services and the notification process is reported to be especially burdensome for foreign investors providing basic and value-added services.

**Canada** ranks second in the chapter for investment restrictions. The country holds certain restrictions for ownership that apply to the telecommunication sector, in particular for companies with a market share above 10 percent. Moreover, foreign direct investment is not allowed for SaskTel. In Canada, there are also nationality requirements for the board of directors of facilities-based telecommunication services suppliers, which stipulate that 80 percent of the members should be Canadian citizens.

In addition, there are several cases reported in which investment in Canada's telecom sector was blocked based on national security reasons. In 2013, the intended acquisition of the Canadian firm Manitoba Telecom Services' Allstream Division by Accelero Capital Holding, which is from Egypt, was blocked on national security grounds. The legal basis for this decision was the national security review of investment regulations from 2009, which allows the Canadian government to block investments in strategic areas of the economy. In another earlier case, VimpelCom Ltd., which is controlled by a Russian company, withdrew a request to acquire a controlling interest in the Canadian wireless carrier, Wind Mobile. The reasons were also related to national security concerns, which were expressed by the Canadian government. In that same year, a second acquisition was also rejected by the Canadian authorities, which involved Lenovo Group Ltd. and Blackberry Ltd. The Canadian government opposed this transaction due to BlackBerry's ties with Canada's telecom infrastructure.

Finally, the Canadian government has recently established rules restricting and monitoring investments by foreign state-owned enterprises (SOEs) in Canada that indicate concerns about the prospects of foreign nationalisation. The definition of SOEs has been expanded by the Investment Canada Act to go beyond foreign state ownership and to include also entities that are "influenced" by a foreign government.

**Thailand** ranks third in the investment chapter. Foreign investment in the telecommunication market is capped at 49 percent according to the Thai Telecommunications Business Act. In addition, in 2011, the Foreign Dominance Regulation BE 2555 introduced foreign dominance criteria in the telecom sector by taking into account elements such as shareholding, management control and supply relationship.

Telecommunication license holders are restricted from performing any actions which are deemed as "foreigner dominance", such as retaining voting shares in a company equal to one-half or more of all voting rights, having controlling power over the majority vote of a company shareholders' meeting, or having the power to appoint or remove one-half or more of a company's directors.

In Thailand, there are also residency and nationality requirements for directors and managers. Moreover, in order to receive permission for the operation of businesses under the Foreign Business Act, foreign investment has to undergo an extensive screening procedure for reasons of national safety and security, economic and social development of the country, public order or good morals, national values in arts, culture, traditions and customs, natural resources conservation, energy, environmental preservation, consumer protection, sizes of undertakings, employment, technology transfer, and research and development.

### MAXIMUM FOREIGN EQUITY SHARE

A third of all economies in the database have some limits on foreign equity shares in at least one of the crucial sectors for digital trade. The most restrictive countries are China, India, Indonesia, Japan, South Korea, Philippines, Russia, Taiwan and Thailand. In these countries, there is either a complete ban in a specific sector or foreign investment has to be limited to minority stakes in more than one sector.

In China, for example, there is a cap on foreign ownership of 50 percent in value-added telecommunication services which includes online database storing and searching, electronic data exchange, online data processing and transactions processing, domestic multiparty communication services, IP-VPN, ISP, ICP as well as video tele-conferencing. In addition, foreign investment in basic telecommunication services (i.e. fixed, mobile and internet) is capped at 49 percent. However, in practice, the telecommunication market is actually closed to foreign companies and all telecommunication companies are Chinese. Moreover, services in the area of internet publishing, including online games, is a sector where investment is prohibited in China.

In India, there are some limits on foreign direct investment in selected telecommunications, audiovisual and mobile broadcasting services. In addition, B2C retail trading in any form by means of e-commerce is not permissible for companies with FDI and which are engaged in the activity of single brand retail trading or multi-brand retail trading. Similarly, in Indonesia online retailing and post retailing are closed to foreign ownership. Therefore, foreign investors cannot participate in e-commerce activities. Moreover, in Indonesia there are also caps in the telecommunication sector and for express delivery services.

In Japan, there is a limit on shares of the incumbent telecommunication operator that can be acquired by foreigners. In South Korea, there are limits in the telecommunication sector as well as for online newspapers. Regarding telecommunications, there is a specific cap of 49 percent of foreign ownership of a facilities-based service supplier of public telecommunications services.

Under the Philippines Constitution, foreign equity ownership in public utilities in the Philippines, including telecommunication companies and value added services, must not exceed 40 percent. In the Philippines, there are also restrictions on e-retailing and, in addition, the Securities and Exchange Commission requires that only Philippine nationals can own the commercial operation of an online platform to market or sell third party products and services.

In Russia, foreign state controlled investors cannot acquire more than 50 percent of majority voting rights of companies considered of "strategic importance". In addition, the amendments of February 2016 of the Law "On Mass Media" require that ownership of all media services by foreign companies and citizens is limited to 20 percent. This has led to large-scale redistribution of property in the media market in Russia and the departure from the country of a number of major international publishers.

In Taiwan, in addition to restrictions that apply specifically to investment from the Chinese Mainland, there are restrictions on foreign ownership in the telecommunication sector, which include also a limit of 55 percent of foreign ownership of the incumbent telecommunication operator.

Thailand also belongs to the most restrictive group of countries regarding foreign ownership. Foreign investment equity share is capped at 49 percent in telecom operators, with or without networks, providing services for one or various segments of the public, and operators providing services to the general public. In addition, as mentioned above, the Foreign Dominance Regulation BE 2555 introduced foreign dominance criteria in the telecom sector by taking into account elements such as shareholding, management control and supply relationship.

## SCREENING OF INVESTMENT

A set of measures collected in this chapter relate to the screening of investment and acquisitions, which can be used to block foreign investments. In certain cases, foreign investors are required to show that the investment is likely to generate net economic benefits. Such requirements are implemented in Bulgaria, Canada, China, Ireland, Malaysia, Mexico, Nigeria, and Vietnam. In other cases, the government has a general horizontal screening requirement on whether the foreign investment is contrary to the country's national interest. This is the case in several countries such as in Australia, Austria, Canada, China, France, Germany, India, Italy, Mexico, Norway, Russia, Taiwan, Thailand, the United Kingdom, and the United States. Yet, only three of these countries have actually used a such screening requirement to block foreign investment in one of the sectors which are crucial for digital trade. These are Australia, Canada, and the United States.

The third case of screening of investment concerns screening of mergers and acquisitions for reasons which go beyond competition policy. There are several countries with general horizontal screenings of mergers and acquisitions, but only a few countries in the dataset have actually used them to block foreign investment.

The French takeover law contains provisions related to hostile takeovers. The law allows the implementation of measures (often referred to as a "poison pill") as a takeover defense. These measures include granting existing shareholders and employees the right to increase their leverage by buying discounted shares through stock purchase warrants. French companies can suspend the implementation of a takeover when targeted by a foreign company whose country of origin does not apply reciprocal rules. The French government has intervened in the acquisition of the Orange streaming service Dailymotion by Yahoo in 2013 arguing that national interest concerns were at stake. As a result, Yahoo was not able to acquire 75 percent of the shares of Dailymotion, but only 50 percent. In 2015, the French government intervened again in Orange's intent to sell Dailymotion.

In the Netherlands, it is reported that, in the 1980s and 1990s, many Dutch firms set up defences to protect themselves against takeovers or activist investors. Although most restrictions have been removed, it is reported that many listed companies still have the possibility to block unsolicited takeover attempts through certain foundations they created. Companies grant these foundations (in Dutch called "Stichting") a call-option to buy preference shares which, if activated, allows them to take control of the company for a certain period of time. In 2013, the call option was used in the case of the America Movil bid to prevent acquiring the majority of shares of KPN which is a Dutch telecom operator.

### 3.2.2 Chapter 5: Intellectual Property Rights

Intellectual Property Rights (IPRs) play a crucial role in fostering innovation and creativity in the digital economy. Having laws that are neither too restrictive nor too lax is important for creating a good environment for businesses to innovate in digital sectors.

The only country in the dataset with a score above 0.50 in this chapter is **China**. The country's high score reflects substantial costs for digital trade deriving from IPRs policies well above the other countries. The second country in the ranking is **Spain**, followed by **Argentina**, **Ecuador**, **the Netherlands**, **Peru** and **Thailand** with the same score. On the other extreme, two countries (New Zealand and Nigeria) have the lowest score.

**China** has several measures in place which justify its ranking. First of all, the country has a series of indigenous innovation promotion policies, which keep entities without Chinese legal status from obtaining accreditation from the Chinese government for their products. Moreover, non-resident foreigners must use an officially designated Chinese agency to apply for a patent on their behalf. For what concerns the area of copyright, Chinese national law does not have a clear fair use/fair dealing principle, but rather a list of limited exceptions to defend the charges of copyright infringement.

In addition, it is reported that there is widespread use of illegal software, both at the commercial and at the private level. Finally, the Multi-Level Protection Scheme (MLPS) introduced by the Ministry of Public Security requires all IT systems in China to be classified on different grade levels of security, from 1 to 5 (with the most sensitive systems designated as level 5). The MLPS requires companies making systems labeled at grade level 3 and above to disclose product source codes, encryption keys, and other confidential business information.

**Spain** ranks second in this chapter and is one of the two EU countries, together with the Netherlands, to appear in the Top 10 most restrictive economies in this chapter. Whereas in the EU there is no general fair use/fair dealing principle for the use of copyright protected material, the Directive 2001/29/EC defines an optional, but exhaustive, set of limitations from the author's exclusive rights under the control of the "three-step test".[5] The Directive has been transposed by Member States with significant freedom and, in the case of Spain, the transposition resulted in a relatively strict regime. The Spanish Intellectual Property Act includes a set of exceptions that are narrowly crafted and apply under specified circumstances and specifically defined activities.

In addition, it is found that Spain suffers from high rates of digital piracy, with the software piracy rate going up to 44 percent in 2015, which represents a commercial value of unlicensed software of USD 913 million. According to the International Intellectual Property Alliance (IIPA), enforcement in Spain needs improvement on criminal, civil as well as administrative fronts. Important to note is also the presence of the Ancillary Copyright Law, which requires online news aggregators such as Google News to remunerate news publishers for showing excerpts of content published on their pages. The publishers are not allowed to waive their right and the collection of the remuneration is entrusted to a single collection agency, which is the organisation representing Spanish newspapers and is called the Association of Editors of Spanish Dailies, known by its Spanish-language abbreviation AEDE. As a result of this law, Google has withdrawn its news page from Spain.

**Argentina**, **Ecuador**, **the Netherlands**, **Peru**, and **Thailand** all rank third in this chapter with an equal score. For what concerns patents, Argentina, Ecuador, Peru, and Thailand impose certain restrictions on the application process for foreigners, which go from particularly high fees to the requirement to have a local agent. In contrast, the Netherlands has restrictions related to the use of legal injunctions. Regarding

[5] This is a clause in the Berne Convention that establishes three cumulative conditions to the limitations and exceptions of a copyright holder's rights.

the area of copyright, all five countries present a strict regime of copyright exceptions. None of the countries implements the provision of fair use, fair dealing or wide exemptions. In addition, copyright is reported to be inadequately enforced in these five countries.

### RESTRICTION ON PATENT APPLICATIONS

More than a third of the countries in the dataset have restrictions related to the application process for local patents or the enforcement of foreign patents. These restrictive measures go from the indigenous promotion policies in China to the requirement to have a local representative in place for filing a patent application. The latter measure applies in Belgium, Brunei, China, Hong Kong, Hungary, India, Indonesia, Italy, Japan, Russia, South Korea, Switzerland, Taiwan, Thailand, and Vietnam. Other measures listed in the database include cases of special treatment for national applicants and especially high patent fees.

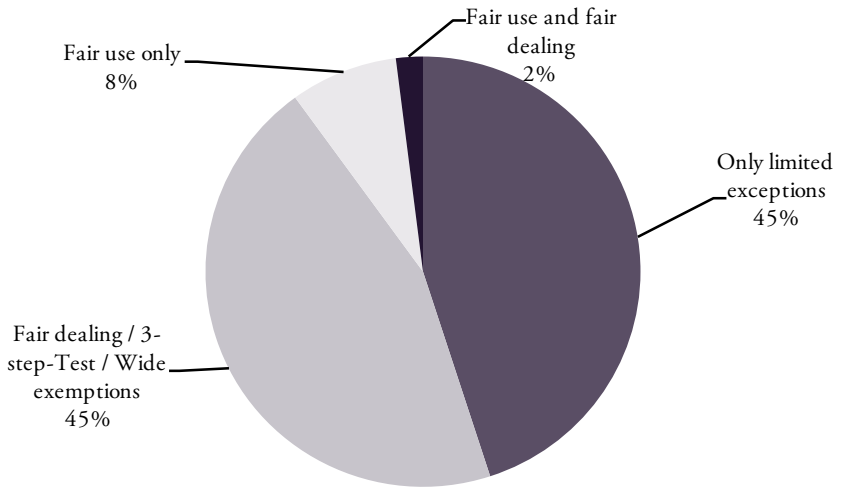
### COPYRIGHT EXCEPTIONS SUCH AS FAIR USE AND FAIR DEALING

South Korea is the only country in the dataset with wide copyright exceptions allowing both fair dealing and fair use of copyrighted material. The Korean Copyright Act offers both an enumerated list of permissible uses with the specific language (as in the European model) and also provides flexibility by means of an open-ended list of permissible uses based on statutory factors when such uses are not found in the enumerated categories (as in the US model).

Almost half of the countries analysed in the database do not have any fair use/fair dealing provision, but rather have limited exceptions. This is also the case of several countries in the EU. In fact, as mentioned above, the Directive 2001/29/EC has been transposed by member states with significant freedom. There are 14 member states having no provision in place such as fair dealing or fair use, while the remaining 14 countries have implemented fair dealing provisions, the three-step test or wide exemptions. In addition to these countries, another 15 countries in the database do not implement either fair dealing provisions, the three-step test nor wide exemptions.

Finally, there are five countries in the database that have a fair use regime. These countries are Israel, the Philippines, Taiwan, Turkey, and the United States. Figure 3.4 shows the overall distribution of the type of copyright exceptions as a percentage of all countries covered in the database.

**Figure 3.4**: Share of Copyright Exceptions by Type (%)




Source: ECIPE.

## LACK OF ENFORCEMENT OF COPYRIGHT LAW

Of all countries covered by the DTRI, around 60 percent have had complaints reported regarding the lack of enforcement of copyright of digital products. These figures indicate that many countries do not take measures to adequately enforce online the copyright laws that exist in their country or have laws that make it difficult for companies to identify copyright infringements. This is the case in Switzerland where it is reported that after a 2010 Federal Supreme Court ruling in the "Logistep Case", which deemed that private companies are not allowed to gather information used to identify possible copyright infringers, case law on the matter has almost entirely come to a standstill.

China is reported to have the highest rate of unlicensed software, including within SOEs. Unlicensed software installation in the country remains at 70 percent and the commercial value of unlicensed software is estimated to be around USD 8.7 billion.

### 3.2.3 Chapter 6: Competition Policy

Fair competition can boost innovation, enhance cross-border trade and, therefore, increase countries' economic performance. In this chapter, we focus mainly on the telecommunication sector, but we also include measures applied in other sectors considered relevant.[6]

A competitive environment in sectors crucial for the digital economy, such as the telecommunication sector, is fundamental to a free market economy and it forms an important source of investment. Widespread access to telecommunication services is also considered one of the conditions for countries' social and economic development through digital trade.

There are 14 countries in our sample that do not impose any restriction in the telecommunication market nor any other sector considered relevant for digital trade and therefore have a score of 0. However, there are also 11 countries with a score above 0.50, presenting a significant level of restrictiveness in relation to competition policy which are a mix of developed and developing countries. These are China, France, Germany, Malaysia, Slovakia, South Africa, Thailand, Vietnam, the United States, Colombia, and Mexico. China represents an outlier with a score significantly higher than the countries that follow in the ranking.

Several measures justify **China's** highest position in the ranking. Its telecommunication sector is not liberalised and there are several SOEs active in various segments of the market. China Telecom Corporation Limited (China Telecom), the incumbent, is a SOE providing basic, mobile and value-added telecommunication services. In 2014, China Telecom had a 52.6 percent market share of the fixed-line broadband market in China and was the third largest mobile services provider. Moreover, it is reported that China imposes strict limitations on companies that wish to offer Voice over Internet Protocol (VoIP) services in the country. It requires a supplier to have a value-added service (VAS) license to provide VoIP service, and a basic telecommunications service license in order to interconnect VoIP services with the public switched telecommunications network.

**France**, **Germany**, **Malaysia**, **Slovakia** and **South Africa** all rank second. The restrictions in **France** and **Germany** are very similar. In France, the incumbent telecommunications operator, Orange (formerly known as France Telecom), was privatised in 2004 and the market of telecommunication was liberalised. Nevertheless, the French government owns 13.6 percent of the total number of shares. In addition, Orange still owns the last mile.[7] Similarly, the Germany incumbent Deutsche Telekom was privatised, but the German state still owns a minority share of 31.7 percent. Like most former incumbents, Deutsche Telekom still owns access to the last mile. It is also reported that several operators in France and Germany are charging higher rates for the termination of international traffic originating from outside the EU than for international traffic between sovereign states inside the EU.

In **Malaysia**, despite a partially liberalised telecommunication market, Telekom Malaysia, which is the incumbent telecommunication operator, is still partially owned by the government (around 29 percent of the shares) and still owns the last mile. Yet, the process of liberalisation of the last mile is in progress and it is expected that it will be completed by 2018. Malaysia also made limited GATS commitments on most basic telecommunications services and it only partially adopted the WTO Reference Paper on Basic Telecommunications. In addition, according to the MCMC guidelines, there is a license requirement for the following operators: Network Facilities Provider (NFP), Network Services Provider (NSP), Content Applications Service Provider (CASP), Applications Service Provider (ASP).

In **Slovakia**, the government owns 49 percent of Slovak Telekom, the incumbent telecommunications operator. Yet, the government announced in April 2015 its intention to sell its stake in the company through an initial public offering. Slovak Telecom still owns access to the last mile. It is also reported that UPC Slovakia (the largest cable television operator in Slovakia) blocked the Internet Protocol television (IPTV) service provided by the telecom operator Antik via the infrastructure of UPC by blocking its

[6] See Section 4 for further explanation in which the methodology for this and other chapters is explained.
[7] The last mile refers to the final leg of the telecommunications networks that deliver telecommunication services to the end-users.

public IP address. This meant that customers who used internet access from UPC were technically precluded from using IPTV service of Antik. UPC apparently did this in order to block competition on its infrastructure, and in an effort to promote its own cable TV retransmission service. The regulator said it was not appropriate for it to rule on the dispute, since there was no law, general measure or decision that forbid blockage of these services. It is also important to notice that in 2014 the European Commission fined Slovak Telekom and its parent, Deutsche Telekom, for abusive conduct in Slovak broadband market. In particular, the Commission concluded that Slovak Telekom refused to supply unbundled access to its local loops to competitors and imposed a margin squeeze on alternative operators.

Regarding **South Africa's** telecom sector, although the country is a signatory of the WTO Reference Paper on Basic Telecommunications (with exemptions), several constraints are still in place. The market was deregulated in February 2005 with the Electronic Communications Act, but Telkom, which is the incumbent, is still owned by the national government with a share of 51 percent and also still owns the last mile. Moreover, one of the authorities in charge of regulating the telecommunications sector in South Africa, namely the South African Department of Communications (DOC), also holds 39.8 percent of Telkom's shares and reportedly often intervenes in management decisions. In 2013, the French company Orange complained that mobile termination rates in South Africa were very high and that the wholesale prices were not capped by the regulator. In that same year, Cell C (South Africa's third-largest mobile operator) filed an antitrust complaint against MTN Group and Vodacom, because the dominant incumbents were reported to discriminate between their on-net and off-net effective prices with a direct impact on smaller operators' ability to acquire new customers.

## TELECOMMUNICATION SECTOR LIBERALISATION

In many of the countries that have been examined, the liberalisation of the telecom market started decades ago and competition rules apply. Yet, despite this widespread liberalisation of the telecommunication sector worldwide, in 42 percent of the countries taken up in our database the last mile is still owned by the incumbent. In about two-thirds of these cases, the government still retains partial or full ownership of the incumbent telecommunication operator. In addition, in 6 percent of the countries in the dataset, deregulation has only occurred in a partial manner or is inexistent so that access to the telecom market is actually still restricted.

## OTHER RESTRICTIONS

Several additional restrictions have been identified and are worth mentioning besides the ones presented above. In 2010 the Argentina government revoked the license of Fibertel, which is owned by Cablevision, to continue operating in the internet access market. The government's decision favored Fibertel competitors Telefonica (via Speedy) and Telecom (with Arnet). Moreover, despite the privatisation of the telecommunication sector in 1990, the incumbent telecommunications operator in Argentina, Empresa Nacional de Telecomunicaciones (ENTEL), has been threatened with nationalisation on numerous occasions.

In Colombia, it is reported that the telecom regulator lacks any effort in monitoring, enforcement or sanctioning powers over infractions to wholesale obligations for fixed broadband markets. In addition, it is reported that Colombia has not yet achieved separation between regulation and effective policymaking in the telecommunication sector, which increases the risk of political interference in the decisions made by the regulator.

Another case involves Mexico. In 2000 the United States initiated a dispute resolution process at the WTO against Mexico for failing to ensure that Telmex provided interconnection to US-cross border basic telecom suppliers on reasonable rates, terms and conditions. In 2004, the panel at the WTO ruled that Mexico violated its GATS commitments for failing to ensure interconnection according to the WTO's Reference Paper on Basic Telecommunications. Mexico and the United States reached an agreement on the compliance of the ruling. However, in 2011, the US Competitive Telecommunications Association

(CompTel) reported that there were still ongoing anti-competitive and discriminatory practices regarding pricing structures for interconnection and termination services.

Finally, foreign and domestic communications service suppliers in the United States have reported that dominant US telecom carriers charge high fees for wholesale access. In fact, according to a 2013 communication of the International Telecommunications Users Group, over 90 percent of last mile business access services in the US is controlled by incumbents, who enjoy profit margins of 60 to 170 percent compared to the US regulator's last authorised rate of return which is just 11.25 percent. This is found to be a significant restriction for new entrants and prevents effective competition.

### 3.2.4 Chapter 7: Business Mobility

Restrictions on business mobility include all measures that affect the movement of natural persons across borders with the goal to provide a service abroad on a temporary basis. Restrictions in this chapter include quotas, labour market tests as well as limits of stay of the foreign natural services suppliers. These measures usually have a horizontal coverage and therefore often do not target the digital sectors alone. Nevertheless, they also affect digital trade and therefore have been listed together with other measures that apply to a specific digital sector.

Although the freedom of movement of natural service suppliers is associated with significant economic benefits, this part of the economy has seen difficulties in liberalising policies over the years. Therefore, we see that several countries remain relatively restricted.

Overall, **Romania** tops the chart for being the most restricted country for business mobility in digital sectors. **Russia** follows, while a group of five countries, namely **Brunei, Panama**, **Singapore**, and **Switzerland** all rank third. Across the whole spectrum of countries that hold a higher-than-average score in digital labour mobility, there is a mix of developed and emerging economies, although the latter are over-represented.

**Romania** has several measures restricting labour mobility. First, it has quotas in place that span all the three types of foreign natural services suppliers, namely on intra-corporate transferees (ICTs), on contractual services suppliers (CSSs) as well as on independent service suppliers (ISSs). These quotas apply for non-EU member states with a limited number of work permits available, which are set on a yearly basis. In addition, Romania holds labour market tests for non-EU citizens, which apply to the three types of natural services suppliers. According to this requirement, foreign service suppliers may be employed only when the employment in a vacant position cannot be ensured from local service suppliers. Finally, for all three types of service suppliers, there are initial limits of stay of 90 days, which can, however, be extended.

**Russia** holds quotas on foreign service suppliers, but with some exceptions for certain qualified specialists. For ISSs, the quota is set at zero as this type of contract of service supplier is not recognised within Russian law. Since 2013, the number of the quotas has been systematically lowered on a yearly basis and amounted to 126,055 in 2015. In addition, Russia puts the condition that its approved quotas need to be in accordance with demographic circumstances whilst also the potential (economic) effect of foreign service suppliers needs to be taken into account. This can be interpreted as a labour market test. The country also prohibits temporary residing service suppliers to change their domicile on their own, unless they have a permission from a local body of the Federal Migration Service. There is also evidence that Russia applies burdensome work permits procedures, which further restrict movement of foreign workers.

**Brunei**, **Panama**, **Singapore**, and **Switzerland** rank third among all economies in the database. These countries use the whole spectrum of trade restrictive measures on business establishments, with a predominance of quotas and labour market tests. Quotas apply in the four countries in all three categories of foreign service suppliers. Labour market tests also apply in the four countries, but in Panama they do not target ICTs. Yet, Panama is the only country in which there are limits of stay, in particular on ICTs.
In addition, for the four countries, there are additional restrictions in place beyond quotas, labour market tests and limits of stay. In **Brunei**, the Local Business Development Framework sets targets based on the sophistication of technology involved and the value of the contract. High technology, low-value contracts are open to all companies and require only best endeavor efforts for local employment and content. Low technology, high-value contracts are only open to local companies, with local employment targets of 50 percent to 90 percent and local content targets above 70 percent.

In **Panama**, employers who want to employ foreign service suppliers must obtain an authorisation issued by the Ministry of Labour and Social Welfare. In addition, according to the Panamanian labour code, employers must give priority to Panamanian workers, workers married to Panamanian citizens or workers with at least 10 years of experience in Panama.

In **Singapore**, depending on which category a foreign worker belongs, as decided by the Ministry of Manpower, the business needs to pay a fee in order to have the foreign worker recruited. The levies differ

and are divided between skilled and unskilled workers with higher levies for unskilled foreign workers. The levies are also set according to a tier system that is fixed for the quotas. In addition, for an Employment Pass for foreign workers there is a requirement to earn at least a minimum wage. The wage is set out according to the different categories of skills, occupations, experience and certifications.

Finally, in **Switzerland**, there are deposit requirements for foreign service providers and an "8 Days Pre-announcement Rule for Workers". This rule requires that temporary service suppliers have to announce themselves in advance to each canton separately, eight days prior to deployment, providing details of name and security numbers. If this does not happen, drastic penalties apply in certain cantons.

## ANALYSIS OF THE MEASURES

Labour market tests are the most prevalent restriction in the database, with two-thirds of the countries in the dataset having such measures in place on at least one type of service supplier. Although more than two-thirds of the countries apply labour market tests, less than one-quarter of the countries do so on all three types of service suppliers. Countries that implement labour market restrictions on all types of service supplies are mainly emerging economies such as China, Brazil, Brunei, Pakistan, and Peru, but the list also includes developed economies such as Australia, Austria, Belgium, and France.

Quotas also make up another sizable share of restrictions (39 percent of all country cases on at least one type of service supplier) and apply in most of the cases to all types of services. The countries implementing quotas are mainly emerging economies. In Europe, quotas are mostly applied by the Eastern bloc such as Bulgaria, Croatia, Estonia, Hungary, and Romania.

Limits of stay are the least applied measure (21 percent of all country cases) and they are often selectively applied on one type of service supplier. Only 14 countries have this type of restriction in place for one year or less, and six countries apply a limit of stay to all three service suppliers, namely Greece, Japan, Pakistan, Portugal, Romania, and Slovenia.

Finally, more than half of the countries in the dataset apply restrictions outside the three conventional categories of limits of stay, labour market tests and quotas. These measures include, among others, the requirement for executive officers to be a resident in Brazil, the requirement that salaries paid to foreign nationals in executive positions must be at least 25 percent higher than the national minimum wage established for a similar position in Costa Rica, or the substantial increases of costs for obtaining work-related permits and visas in South Korea. In other countries, such as Malaysia, it had been reported that foreign workers were required to be fired first compared to Malaysian nationals.

Some European countries also apply other types of restrictions related to labour mobility. For instance, in the United Kingdom, some occupations are restricted for migrant visas together with a reduction of the number of non-EU work visas. In Germany and the Netherlands, an increased minimum wage was found for the high-skilled non-EU workers. Some European countries including the United Kingdom also hold a targeted migration policy against Bulgaria and Romanian service suppliers.

## MEASURES TARGETING DIGITAL SECTORS SPECIFICALLY

Most of the measures in this chapter are of a horizontal nature and therefore apply also across digital sectors. Yet we also include all those measures that specifically target a sector or profession that is crucial for digital trade. Although there are not many such measures, some of them stand out.

For instance, in Vietnam, employers willing to recruit a foreign CSS in the computer and related services sector must post the vacancy in at least one national and one local newspaper 30 days prior to the intending hiring date. In Indonesia, Electronic Service Providers are required to employ Indonesian citizens to operate strategic electronic systems. Another example is found in India. Although the country did relax some of its regulatory measures regarding recruiting foreign professionals in the IT industry, it now requires a foreign

service supplier in this sector to have a declaration stating that its annual salary exceeds 25,000 USD. Finally, in Canada, some regions have raised the minimum salary requirements for certain IT professionals.

## 3.3 Cluster C: Restrictions on Data

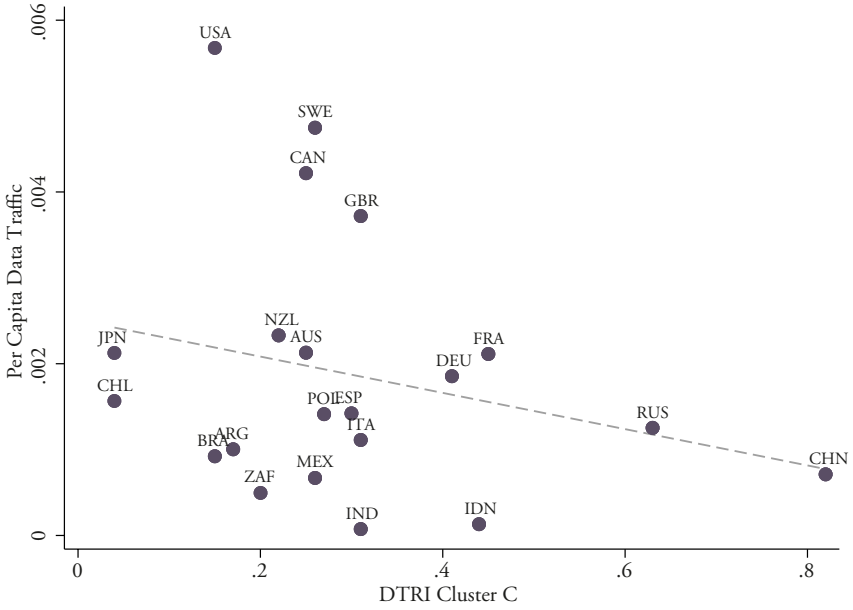
Cluster C on Data covers policy measures in three main areas: Data Policies, Intermediate Liability and Content Access.

China ranks first in this cluster with a score of 0.82, followed by Russia and Turkey. These are the only three countries with a score above 0.50. France and Germany rank fourth and seventh respectively, reflecting significant levels of restrictions when it comes to policies on data flows, usage and access. The only other OECD country among the Top 10 most restrictive economies is South Korea, which ranks eighth.

On the other extreme, there are four countries in the sample with an especially low level of restrictions and a score below 0.05. These are Chile, Costa Rica, Japan, and Panama. The average level of restrictiveness in this cluster is 0.25, which is only slightly higher than the average of the full composite index of 0.24.

Countries which have a higher index score in this cluster are also the ones that exhibit lower levels of per capita data traffic, as shown in Figure 3.5. The figure plots the cluster index on the horizontal axis whilst plotting the per capita IP traffic in petabytes on the vertical axis. It shows that countries with higher levels of data restrictions are also the ones that generate less data in their economies.[8]

**Figure 3.5**: DTRI Cluster C Index Score and Per Capita Data Traffic




Source: ECIPE, Cisco and WDI; authors' calculations.

We turn now to present the country rankings for each of the three chapters and a summary of the regulations presented in the database that justify the position of the countries in the chapter rankings. We also highlight certain policy measures which are particularly relevant in the chapters and provide an overview of the implementation of such measures in different countries.

[8] Information on data traffic comes from Cisco's VNI Global IP traffic forecast project that measures how much data traffic is present in each of the countries taken up in their sample and which is measured in petabytes per month (Cisco, 2015). Since total data traffic would give us a distorted measure due to country size, this variable is divided by the size of the market of each country using population as a proxy.

**Table 3.3**: DTRI Cluster C Score and Ranking, including Chapters 8-10

| | C. Restrictions on Data | | Data Policies | Intermediary Liability | Content Access |
|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** |
| **1** | **CHN** | **0.82** | RUS | CHN | CHN |
| **2** | **RUS** | **0.63** | TUR | TUR | VNM |
| **3** | **TUR** | **0.60** | CHN | THA | MYS |
| **4** | **FRA** | **0.45** | DEU | BRN | RUS |
| **5** | **IDN** | **0.44** | FRA | COL | BRN |
| **6** | **VNM** | **0.43** | KOR | ECU | IDN |
| **7** | **DEU** | **0.41** | DNK | LTU | SGP |
| **8** | **KOR** | **0.39** | POL | HKG | IND |
| **9** | **BRN** | **0.38** | VNM | IDN | PAK |
| **10** | **DNK** | **0.35** | FIN | ISR | THA |
| **11** | **MYS** | **0.35** | ITA | MEX | TUR |
| **12** | **LTU** | **0.34** | GBR | NZL | FRA |
| **13** | **FIN** | **0.33** | CAN | NGA | DEU |
| **14** | **ITA** | **0.31** | AUS | PAK | AUS |
| **15** | **GBR** | **0.31** | ESP | PRY | DNK |
| **16** | **IND** | **0.31** | GRC | PER | FIN |
| **17** | **PAK** | **0.30** | SWE | CHE | AUT |
| **18** | **ESP** | **0.30** | IDN | RUS | HUN |
| **19** | **HUN** | **0.30** | MLT | ARG | ITA |
| **20** | **THA** | **0.29** | HUN | FRA | LTU |
| **21** | **ROU** | **0.27** | EUR | SWE | PRT |
| **22** | **POL** | **0.27** | BGR | IND | ROU |
| **23** | **MEX** | **0.26** | MEX | KOR | GBR |
| **24** | **SWE** | **0.26** | CYP | BRA | ECU |
| **25** | **AUS** | **0.25** | LUX | BEL | ESP |
| **26** | **CHE** | **0.25** | EST | CZE | KOR |
| **27** | **CAN** | **0.25** | IRL | DNK | CAN |
| **28** | **SGP** | **0.25** | LVA | EST | ZAF |
| **29** | **EUR** | **0.24** | LTU | FIN | EUR |
| **30** | **GRC** | **0.23** | PRT | DEU | SVK |
| **31** | **COL** | **0.23** | AUT | GRC | PRY |
| **32** | **NGA** | **0.23** | BEL | HUN | BRA |
| **33** | **MLT** | **0.22** | NLD | IRL | GRC |
| **34** | **PER** | **0.22** | ROU | ITA | POL |
| **35** | **NZL** | **0.22** | ISL | LVA | NZL |
| **36** | **PRT** | **0.22** | TWN | LUX | CHE |
| **37** | **AUT** | **0.21** | CHE | MLT | USA |
| **38** | **ZAF** | **0.20** | SGP | POL | ARG |
| **39** | **ECU** | **0.20** | SVN | ROU | CHL |

| | C. Restrictions on Data | | Data Policies | Intermediary Liability | Content Access |
|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** |
| **40** | **LUX** | **0.20** | HRV | SVK | COL |
| **41** | **EST** | **0.20** | PHL | SVN | CRI |
| **42** | **IRL** | **0.20** | IND | ESP | BEL |
| **43** | **LVA** | **0.20** | COL | GBR | BGR |
| **44** | **SVK** | **0.19** | BRN | ISL | HRV |
| **45** | **BEL** | **0.19** | NGA | MYS | CYP |
| **46** | **ISL** | **0.19** | CZE | NOR | CZE |
| **47** | **ISR** | **0.18** | SVK | ZAF | EST |
| **48** | **SVN** | **0.18** | PER | USA | IRL |
| **49** | **ARG** | **0.17** | NZL | EUR | LVA |
| **50** | **HKG** | **0.16** | USA | CAN | LUX |
| **51** | **CZE** | **0.16** | ZAF | VNM | MLT |
| **52** | **PRY** | **0.16** | ARG | AUS | NLD |
| **53** | **USA** | **0.15** | NOR | CHL | SVN |
| **54** | **BRA** | **0.15** | PAK | CRI | SWE |
| **55** | **BGR** | **0.14** | MYS | AUT | HKG |
| **56** | **CYP** | **0.14** | ISR | BGR | ISL |
| **57** | **NOR** | **0.13** | BRA | HRV | ISR |
| **58** | **NLD** | **0.13** | JPN | CYP | JPN |
| **59** | **TWN** | **0.12** | CHL | NLD | MEX |
| **60** | **HRV** | **0.11** | CRI | PRT | NGA |
| **61** | **PHL** | **0.11** | HKG | JPN | NOR |
| **62** | **JPN** | **0.04** | THA | PAN | PAN |
| **63** | **CHL** | **0.04** | PAN | PHL | PER |
| **64** | **CRI** | **0.04** | PRY | SGP | PHL |
| **65** | **PAN** | **0.03** | ECU | TWN | TWN |

### 3.3.1 Chapter 8: Data Policies

An increasing number of companies, from banks to traditional manufacturing companies, rely heavily on the internet and the free flow of data across the globe throughout their business activities. Given the crucial dependence of our economy on data, certain policies on data flows can be legitimate and necessary to protect the privacy of the individual or to ensure national security. However, there are often less trade restrictive policy measures which are available to the country to achieve its non-economic policy objective. In this chapter, we list all those measures that restrict flow of electronic data and therefore create a cost to conduct digital trade.

Although **China** is the most restrictive economy in the overall cluster on restrictions on data, it ranks third in this chapter. Instead, the most restrictive country when it comes to data policies is **Russia**, followed by **Turkey**. Immediately next in the ranking comes a series of high-income economies. In particular, Denmark, France, Germany, and South Korea which all have a score above 0.50.

The position of **Russia** is justified by several measures, most of which have been implemented recently. In July 2014, the Russian data protection law was amended by the Federal Law No. 242-FZ to include a clear data localisation requirement. Article 18 §5 requires data operators to ensure that the recording, systematisation, accumulation, storage, update/amendment and retrieval of personal data of the citizens of the Russian Federation is made using databases located in the Russian Federation. This amendment entered into force on 1 September 2015. On top of this requirement, there are also sectoral data localisation requirements in the financial sector and in the media sector. There is also a conditional flow regime according to which the transfer of personal data outside Russia requires additional consent from the data subject unless the jurisdiction to which the data is transferred ensures adequate protection (Federal Law no. 152-FZ "On Personal Data").

In Russia, there are also three laws imposing strict data retention requirements on Internet Service Providers (ISPs) and companies defined as "organizers of information distribution in the internet".[9] Moreover, an order drafted by Minsvyazi, which is the Russian Ministry of Communications, requires telecom and internet providers to install equipment allowing data collection and retention on their servers for a minimum of 12 hours. This provides the Russian Federal Security Service (FSB) with direct access to a wider range of data without a court order for the purposes of national anti-terrorist investigations. Such data include users' phone numbers, account details on popular domestic and overseas online resources such as Gmail, Yandex, Mail.ru, etc., IP addresses and location data. In Russia, there is also the recognition of the right to be forgotten which, contrary to the European framework, also covers public figures. Finally, the Federal Law no. 152-FZ includes requirements to perform a detailed data protection impact assessment.

**Turkey** ranks second in this chapter. In April 2016, the country passed its first comprehensive Data Protection Law (Law No. 6698), which set out a conditional flow regime. The legislation stipulates that data cannot be processed or transferred abroad without the individual's explicit consent, subject to certain exceptions. Moreover, a strict data localisation rule applies to e-money institutions and payment services providers, which are required to "keep all the documents and records related to [their activities] for at least ten years within the country, in a secure and accessible manner". This rule also represents a data retention requirement. Since 2015, the right to be forgotten also applies in Turkey. It is also important to note that the Turkish e-commerce law bans commercial messages sent electronically by email, text messaging (SMS), fax, and autodial machines to consumers without their prior approval. Finally, the new amendments to the Law No. 5651 on Regulating the Internet passed in March 2015 allowing authorities access to user data without a warrant, resulting in the possibility for the Turkish regulator to ban content to secure the protection of life and private property, protection of national security and public order, prevention of crimes, and protection of public health, without a prior court order.

**China** imposes a wide range of measures that directly impact cross-border data flows and ranks third in this chapter. On top of a general data localisation rule which requires companies to store the data they

[9] It is not clear which companies fall under this definition.

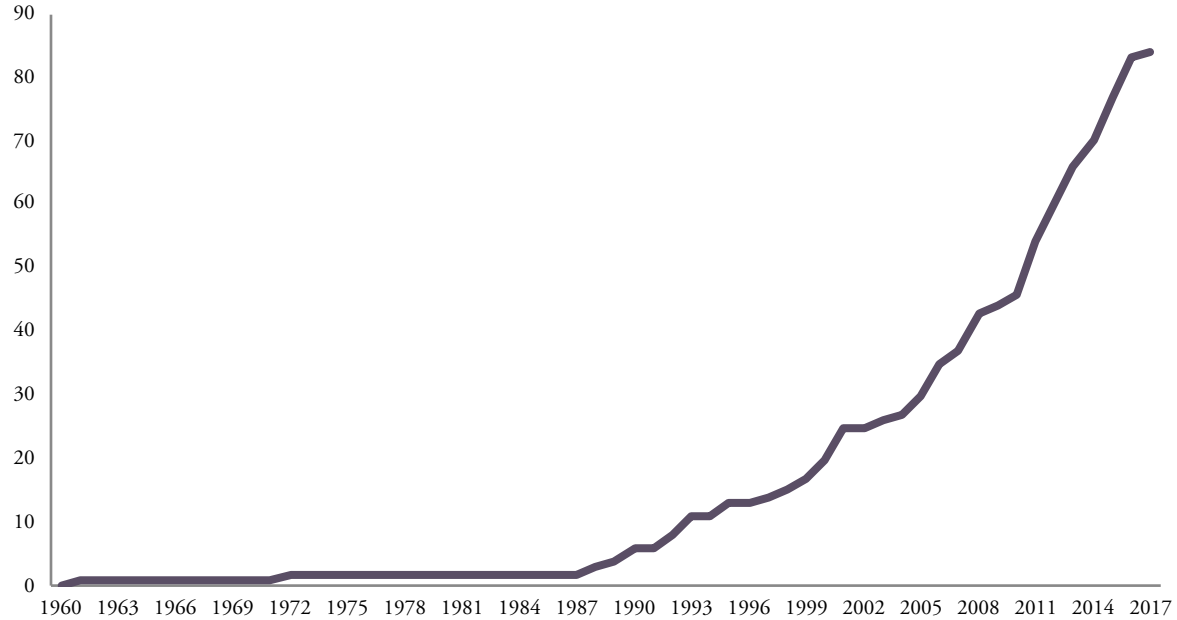
collect only on servers in the country, there is a series of ad hoc data localisation rules in the financial sectors, healthcare sector, taxi sector, electronic media, as well as on mapping services and trade secrets. Moreover, the recently approved Cybersecurity Law has a wide data localisation requirement. The new law includes requirements for personal information of Chinese citizens and "important data" collected by "key information infrastructure operators" (KIIOs) to be kept within the borders of China. If there are business needs for the KIIOs to transfer this data outside of China, security assessments must be conducted. China also requires ISPs to retain users' data for a minimum period of 60 days whilst the Administrative Provisions on Information Services of Mobile Internet Application Programs also require that app providers keep records of users' activities for 60 days.

In addition, China also requires strict and detailed consent requirements for the collection of data. Of important note, the State Security Law permits the state security organ, when necessary, to access any information or data held by anyone in China. In addition, the Law of the People's Republic of China on Protection of Consumer Rights and Interests gives the regulator the right to shut down and de-register the business in case of a data breach.

## DATA LOCALISATION TRENDS

The DTE database compiles a detailed list of data localisation measures, which are measures that either mandate data to be kept locally or impose conditions to transfer data cross-border. The database records 84 data localisation requirements that are currently imposed across the 64 economies taken up in the DTRI. As shown in Figure 3.6, the last decade has seen a worrying increasing trend of data localisation worldwide. The oldest measure, which actually pre-dates the internet, but was later enforced also online, was implemented as early as 1961. Until the year 2000, only 19 measures were imposed globally. However, by 2008, the number of measures more than doubled and it doubled again until today.

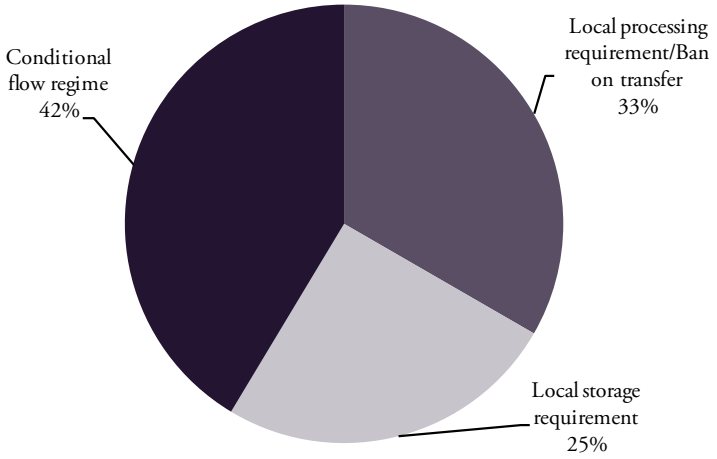
**Figure 3.6**: Cumulative Number of Data Localisation Measures (1961-2016)




Source: ECIPE; authors' calculations. Note: When the year of the law was not available, the year in which the measure was reported is considered. The graph does not include one measure for which the year was not available.

When looking at the different categories of data localisation measures, the majority of the measures (42 percent) impose conditional flow regimes as shown in Figure 3.7.[10] In these cases, certain conditions have to be fulfilled before the data can be transferred abroad. In addition, 33 percent of the measures belong to the most restrictive category of ban on transfer and local processing requirements. These measures require the company to use a local server for the main processing of the data and, in the case of a ban on transfer, not even a copy of the data can leave the implementing jurisdiction. Finally, 25 percent of the measures are local storage requirements, which means that a copy of certain data has to remain within the country, although the data itself can be processed abroad.

**Figure 3.7**: Share of Data Localisation Measures by Type (%)




Source: ECIPE; authors' calculations.

## DATA RETENTION

Around half of the countries in the database apply a regulation requiring a minimum period of retention for certain data. In most cases, these requirements are aimed at telecommunication companies, which are required to store records documenting online activities of users. In the case of Russia, there are three such requirements that are especially strict. In particular, the Federal Law No. 97 (often referred to as Blogger's law) is a case *sui generis* by requiring "organizers of information distribution in the internet" to store on Russian territory information on facts of receiving, transfer, delivery and/or processing of voice information, texts, images, sounds and other electronic messages and information about users during six months from the end of these actions.

An observation in the area of data retention is that, on 8 April 2014, the Court of Justice of the European Union (ECJ) declared the Directive on Data Retention to be invalid. Under the Directive, operators were required to retain certain categories of traffic and location data for a period between six months and two years and to make them available upon request to law enforcement authorities for the purposes of investigating, detecting and prosecuting serious crimes and terrorism. Since the invalidation, not all national laws implementing the Directive have been overturned. Moreover, as mentioned above, while the initial law was overturned in Germany in October 2015, a new data retention law has passed which will enter into force in 2017. In addition, the Investigatory Powers Bill, which includes data retention requirements, was also recently approved in the UK.

[10] Please refer to Section 4 of the report for details on the categorisation.

## RIGHT TO BE FORGOTTEN

The database also presents an extensive list of regulations related to the right to be forgotten, which grants individuals the possibility to seek the deletion of links on search engines about themselves if the information is outdated or irrelevant. This right is recognised in Argentina, Australia, the EU, Hong Kong, Japan, Russia, and Turkey. Moreover, the ruling of the European Court of Justice recognising the right to be forgotten in the 28 EU Member States was also *de facto* implemented in four other countries, Iceland, Liechtenstein, Norway, and Switzerland. In March 2016, the French data protection regulator (i.e. the Commission Nationale de l'Informatique et des Libertés or CNIL) fined Google EUR 100,000 for not applying Europe's right to be forgotten across the search engine's global network of sites.

## OPEN GOVERNMENT ACCESS TO PERSONAL DATA COLLECTED

There are six countries in the database that allow governments to access personal data that is collected by the companies without a court decision, a warrant or any other mean which is usually used in an investigation in the "offline" world. These are China, Costa Rica, France, Russia, Turkey, and Vietnam. It is also reported that the Nigerian Communications Commission (NCC) is working on a regulatory text that would grant similar rights to government agencies.

### 3.3.2 Chapter 9: Intermediary Liability

Internet intermediaries are those companies that act as an intermediary between content producers and the internet, facilitating its use. Such companies include Internet Service Providers (ISPs), search engines and social media platforms.

In those jurisdictions that provide a safe harbour mechanism, the intermediary is shielded from the responsibility for the user's actions as long as it respects certain conditions and acts promptly when notified of an illicit behavior. Conversely, in those jurisdictions without a safe harbour framework, intermediaries bear the legal responsibility, i.e. "liability", for illegal or harmful activities performed by users through their services. They have the obligation to prevent the occurrence of unlawful or harmful activity by users of their services and, in case of failure to comply with such obligation, they might be exposed to civil or criminal legal action.

The existence of a safe harbour, therefore, is considered a strategic factor supporting the emergence of innovative services: it provides intermediaries with the sufficient legal certainty to conduct a wide range of activities, free from the threat of potential liability and the chilling effect of potential litigation. This chapter summarises the countries' situation in relation to intermediary liability and additional requirements that intermediaries are requested to fulfill.

There are three countries in this chapter that show a score above 0.50. They are **China**, **Turkey** and **Thailand**. On the other hand, 19 countries have no restrictions or almost no restrictions in this area, and therefore have a safe harbour framework in place and no other restrictions related to liability of intermediaries.

In **China**, according to the Guiding Framework on the Protection of Copyright for Network Dissemination, the intermediary is not entitled to the safe harbour defense. The notice and takedown procedure is also considered strict. The service provider should remove the infringing content/link immediately upon notice from the copyright owner, or within 24 hours if there is too much content or too many links to deal with and the takedown process is considered particularly complicated. If the service provider is unable to take down the infringing content/link within this time span, they should provide an explanation to the copyright owner in writing immediately.

In May 2014, the Chinese government revoked the internet business license of Shenzhen QVOD Technology Inc, a Chinese online peer-to-peer video-hosting platform with over 300 million users, and forced it to shut down all servers. In addition, the Decision on Strengthening Network Information Protection requires network service providers in China to request their users to provide real identity information when concluding service agreements or accepting the provision of services. These apply to all network service providers that: provide website access services; handle internet access formalities for fixed telephones, mobile telephones, and other means of internet access; or provide information publication services to users.

Of importance is also the Counter-Terrorism Law issued in 2016. This law requires telecoms and ISPs to establish content monitoring and network security programs. The companies are required to adopt precautionary security measures to prevent the dissemination of information on extremism, to report terrorism information to the authorities in a timely manner, to keep original records, and to promptly delete such messages to prevent further circulation.

**Turkey** ranks second in this chapter. Law No. 5651 of 2007 regulates the liability of internet intermediaries, but it fails to provide a safe harbour for ISPs. In addition, the notice and takedown procedure under the Turkish Code of Intellectual and Artistic Work is quite strict as it requires the hosting, content or access providers to take down the infringing content from their servers upon "notice" given by the right holders. The providers need to take action within 72 hours. If the allegedly infringing content is not taken down or there is no response from the providers, the right holders can ask the Public Prosecutor to provide a blocking order to be executed within 72 hours.

In **Thailand**, which ranks third in this chapter, the Computer-Related Offences Act does not provide a safe harbour for intermediaries and does not make any distinction between different types of intermediaries. Therefore, all internet intermediaries are subjected to the same liability. Moreover, in case of non-compliance with the notice, there are both financial sanctions and the possibility of up to five years of imprisonment.

## USER IDENTITY REQUIREMENTS

Three countries in the DTE database impose user identity requirement on internet intermediaries. These are China, Russia, and Vietnam. In China, the Decision to Strengthen the Protection of Online Information requires intermediaries to obtain real identity information when providing internet access services and information publication services. Furthermore, an additional regulation requires users of blogs, microblogs, instant messaging services, online discussion forums, news comment sections and related services to register with their real names and avoid spreading content that challenges national interests.

In Russia, the Government Decrees No.758 of 31 July 2014 and No.801 from 12 August 2014 impose public Wi-Fi user identification. These decrees require, amongst other things, that ISPs should identify internet users by means of identity documents such as a passport.

In Vietnam, Decree No.72 requires online social network service suppliers to ensure that only individuals who have supplied "accurate and complete personal information as required by law", including the government-issued card number, may create blogs or provide information on online social networks.

### 3.3.3 Chapter 10: Content Access

Restrictions to access certain content online can increase the cost of offering services online and, in some cases, even make it impossible. Therefore, this database also includes a chapter specifically dedicated to issues related to content blocking, filtering, and discrimination through network bandwidth.

There are six countries in the dataset that have significantly high restrictions in place in this chapter, with a score above 0.50. They are **China**, **Vietnam**, **Malaysia**, Russia, Brunei, and Indonesia. In contrast, around 30 countries have no or almost no restrictions on content access in place. These countries are mainly found in Europe and Latin America and are smaller open economies.

**China**'s top position in this ranking is justified by several policy measures. The country has a centralised control mechanism over international gateways and it is reported that it makes use of sporadic localised shutdowns of internet access to quell social unrest. The nation-wide blocking, filtering, and monitoring system, which is referred to as Golden Shield, delays or interrupts access to international websites. In particular, it is reported that at least 14,000 search terms on search engines are filtered. It is also found that there are deliberate slowdowns of foreign websites through the use of Deep Packet Inspection.

Since 2012, the Golden Shield has also started to block Virtual Private Networks (VPNs). The government has shut down access to entire communications systems in response to specific events, notably imposing an internet blackout of 10 months in the Xinjiang Uighur Autonomous Region in 2009.

Moreover, selected web applications are blocked and the video-sharing platform YouTube and social media sites like Facebook, Twitter, Google+ and Foursquare are inaccessible. Document-sharing applications like Google's cloud storage service Drive are also blocked and other Google applications like Calendar and Translate have been inaccessible since June 2014.

In addition, website providers are required to apply for an Internet Content Provider (ICP) license to operate their website in China. This restriction applies to both domestic and foreign businesses. Domestic internet firms must prevent banned content from circulating as part of their licensing requirements. Sina, one of the biggest online media companies in China, had its online publication license cancelled in 2014 for having allegedly spread online publications with banned content.

**Vietnam** ranks second in this chapter. Decree 72 of 2013 sets the obligation of Internet Service Providers (ISPs) to coordinate with the state the removing or blocking of information that contains 'prohibited acts' which include: state opposition undermining national security and social order; conducting propaganda; propagating obscenity, pornography and harming national traditions and customs; providing information offending organisations or individuals; and advertising banned good and services, banned newspapers, works and publications. Various press reports have highlighted the controversial nature of Decree 72 and its wide scope regarding the capacity to block websites.

Furthermore, the state regulation determines how internet connectivity in Vietnam is organised and managed, and it is reported to facilitate internet content filtering by limiting external access points that must be controlled. Only Internet Exchange Points (IXPs) can connect to the internet, while Online Service Providers (OSPs) and ICPs may connect to ISPs and IXPs. While any Vietnamese firm can operate as an ISP, only state-owned companies are allowed to operate as IXPs and OSPs. Internet filtering happens at the Domain Name System (DNS) level, which means that instead of blocking a site, ISPs configure domain names to resolve to an invalid address or remove blocked websites from their DNS servers.

Finally, Decree 72 also has special obligations on social networks. Social networks are required to prevent any information that defames the state of Vietnam from being published. Additionally, it provides that the establishment of an online social network requires a license from the Ministry of Information and Communication (MIC). In addition, Decree 72 bans personal blogs from providing "aggregated information". Vietnam's Broadcast and Electronic Information Department has reportedly used this clause as a justification to warn users not to "quote or share information from press agencies or websites of

government agencies." Personal webpage owners are only allowed to provide their own information and are prohibited from taking news from media agencies and using that information as if it were their own.

**Malaysia** ranks third in this chapter. It is reported that the broad application of the Communications and Multimedia Act can be a restriction for digital companies, especially social media. The Act gives the Malaysian Communications and Multimedia Commission (MCMC) a broad authority to regulate online speech, requiring that "no content applications service provider, or other person using a content applications service, shall provide content which is indecent, obscene, false, menacing, or offensive in character with intent to annoy, abuse, threaten or harass any person".

According to a 2013 report by Freedom House, government officials confirmed that 6,640 sites had been blocked since 2008. In February and March 2016, the MCMC blocked three news websites and three socio-political blogs, which published critical information regarding corruption allegations against Prime Minister Najib Razak. The websites that were blocked include the foreign-owned Medium, the Asia Sentinel as well as blogs such as OutSyed The Box, Din Turtle and Minaq Jingo Fotopages.

The Sedition Act, which was amended in 2015, has also created worries for censorship and blocking purposes. The US State Department has acknowledged that "particularly worrying are new provisions that increase penalties, including for first-time offenders, and could make sharing allegedly seditious material on social media a crime". It is also reported that packet filtering is being applied to check for text in hostname header, video ID and URL to block or delay access to sites. In 2015, it reported filtering on YouTube videos and several Facebook group pages that contest or mock the government as well as the Malaysian website Malaysiakini.

Finally, according to the MCMC guidelines, there is a license requirement for Network Facilities Providers, Network Services Providers, Content Applications Service Providers as well as Applications Service Providers.

### BLOCKING OF COMMERCIAL WEBSITES

There are ten countries among those analysed that have implemented the blocking of commercial websites that go beyond blocking on the ground of copyright or gambling. In addition to the cases already mentioned regarding China, Malaysia and Vietnam, other countries implementing such blockings are Brunei, India, Indonesia, Pakistan, Russia, Thailand, and Turkey.

### FILTERING OF WEB CONTENT

There are seven countries in the sample which implement filtering of web content. These are Canada, China, Indonesia, Malaysia, Russia, South Korea, and Vietnam. In both the cases of Canada and South Korea, however, these practices are limited. In Canada, in June 2014 the British Columbia Supreme Court granted a worldwide injunction in favour of Equustek Solutions Inc. that ordered Google to stop mentioning Datalink, a company that violated Equustek trademarks, in all of its search results. This decision was confirmed in 2015. Thus, Google was ordered to remove Datalink's websites from all of its search pages globally. In South Korea, instead, such practices are used mainly to target online gambling.

## 3.4 Cluster D: Trading Restrictions

The cluster Trading Restrictions covers policy measures in three main areas: Quantitative Trade Restrictions, Standards, and Online Sales and Transactions.

China ranks first in this cluster with a score of 0.63, even though it is at the top of the rankings only in the chapter on Standards. Other countries with a score for this cluster above 0.50 are Argentina and Vietnam.

Overall, the Top 10 most restrictive countries in this cluster are all emerging economies. On the other extreme, New Zealand is the only country with no restrictions in place regarding trading restrictions, while Panama and Switzerland have almost no restrictions in this area. The average level of restrictiveness in this cluster is 0.21, which is somewhat lower compared to the overall DTRI of 0.24.

Below we present the country rankings for each of the three chapters as well as a summary of the regulations presented in the database that justify the position of the countries in the chapter rankings. We also highlight certain policy measures which are particularly relevant in the chapters and provide an overview of the implementation of such measures in different countries.

**Table 3.4**: DTRI Cluster D Score and Ranking, including Chapters 11-13

| | D. Trading Restrictions | | Quantitative Trade Restrictions | Standards | Online Sales & Transactions |
|---|---|---|---|---|---|
| Rank | Country | Index | Country | Country | Country |
| 1 | **CHN** | **0.63** | ARG | CHN | VNM |
| 2 | **ARG** | **0.57** | CHN | IND | ARG |
| 3 | **VNM** | **0.51** | BRA | KOR | IDN |
| 4 | **BRA** | **0.49** | TUR | VNM | BRA |
| 5 | **IDN** | **0.48** | ECU | PAK | CHN |
| 6 | **RUS** | **0.43** | IDN | TWN | FRA |
| 7 | **IND** | **0.40** | MYS | ISR | TWN |
| 8 | **TUR** | **0.37** | NGA | BRA | RUS |
| 9 | **ECU** | **0.35** | RUS | ECU | DEU |
| 10 | **MYS** | **0.35** | VNM | IDN | KOR |
| 11 | **NGA** | **0.34** | BEL | MEX | ESP |
| 12 | **FRA** | **0.33** | HRV | TUR | IND |
| 13 | **PAK** | **0.31** | CYP | CAN | MYS |
| 14 | **TWN** | **0.30** | CZE | CHL | MEX |
| 15 | **ESP** | **0.29** | EST | CRI | THA |
| 16 | **KOR** | **0.28** | FRA | HKG | CRI |
| 17 | **THA** | **0.28** | HUN | RUS | COL |
| 18 | **HKG** | **0.27** | ITA | NGA | ROU |
| 19 | **MEX** | **0.27** | LTU | ARG | HRV |
| 20 | **CAN** | **0.26** | MLT | THA | CYP |
| 21 | **DEU** | **0.26** | POL | DEU | DNK |
| 22 | **ROU** | **0.25** | ROU | GBR | ITA |
| 23 | **HRV** | **0.25** | SVK | BRN | SGP |
| 24 | **CYP** | **0.25** | SVN | FIN | NGA |

| | D. Trading Restrictions | | Quantitative Trade Restrictions | Standards | Online Sales & Transactions |
|---|---|---|---|---|---|
| **Rank** | **Country** | **Index** | **Country** | **Country** | **Country** |
| **25** | **ITA** | **0.25** | ESP | PRY | PHL |
| **26** | **ISR** | **0.23** | HKG | PHL | ZAF |
| **27** | **HUN** | **0.22** | PAK | JPN | CAN |
| **28** | **POL** | **0.20** | IND | COL | FIN |
| **29** | **SVK** | **0.20** | ISR | MYS | HUN |
| **30** | **SVN** | **0.20** | AUS | PER | USA |
| **31** | **CRI** | **0.19** | CAN | ZAF | HKG |
| **32** | **EST** | **0.17** | EUR | EUR | ECU |
| **33** | **PHL** | **0.17** | THA | USA | PAK |
| **34** | **EUR** | **0.16** | MEX | AUS | TUR |
| **35** | **FIN** | **0.16** | PRY | AUT | JPN |
| **36** | **AUS** | **0.15** | PHL | BEL | ISL |
| **37** | **BEL** | **0.15** | AUT | BGR | NOR |
| **38** | **CZE** | **0.15** | BGR | HRV | EUR |
| **39** | **DNK** | **0.15** | DNK | CYP | AUT |
| **40** | **LTU** | **0.15** | FIN | CZE | GRC |
| **41** | **MLT** | **0.15** | DEU | DNK | LUX |
| **42** | **COL** | **0.14** | GRC | EST | POL |
| **43** | **USA** | **0.12** | IRL | FRA | SVK |
| **44** | **CHL** | **0.12** | LVA | GRC | SVN |
| **45** | **PRY** | **0.11** | LUX | HUN | SWE |
| **46** | **ZAF** | **0.11** | NLD | IRL | CHL |
| **47** | **SGP** | **0.11** | PRT | ITA | AUS |
| **48** | **JPN** | **0.11** | SWE | LVA | BRN |
| **49** | **AUT** | **0.10** | GBR | LTU | BGR |
| **50** | **GRC** | **0.10** | USA | LUX | EST |
| **51** | **LUX** | **0.10** | BRN | MLT | PRY |
| **52** | **SWE** | **0.10** | CHL | NLD | PER |
| **53** | **GBR** | **0.10** | COL | POL | CHE |
| **54** | **BRN** | **0.08** | CRI | PRT | IRL |
| **55** | **ISL** | **0.08** | ISL | ROU | BEL |
| **56** | **NOR** | **0.08** | JPN | SVK | CZE |
| **57** | **BGR** | **0.07** | KOR | SVN | LVA |
| **58** | **IRL** | **0.05** | NZL | ESP | LTU |
| **59** | **LVA** | **0.05** | NOR | SWE | MLT |
| **60** | **NLD** | **0.05** | PAN | ISL | NLD |
| **61** | **PRT** | **0.05** | PER | NZL | PRT |
| **62** | **PER** | **0.05** | SGP | NOR | GBR |
| **63** | **CHE** | **0.03** | ZAF | PAN | ISR |
| **64** | **PAN** | **0.02** | CHE | SGP | PAN |
| **65** | **NZL** | **0.00** | TWN | CHE | NZL |

### 3.4.1 Chapter 11: Quantitative Trade Restrictions

This chapter covers different types of quantitative trade measures that negatively impact the import and export of digital goods and products. On the one hand, import and export restrictions such as bans and quotas as well as overly restrictive or non-transparent import licensing schemes and procedures are included. On the other hand, local content requirements (LCRs) applied on products and services sold on commercial markets are reported.[11]

The scores for all measures included in this chapter range from 0 to 0.90. Looking at the Top 10 countries with the highest scores, it emerges that the more stringent measures are found in Asia and Latin America. The country with the highest score is **Argentina**. This country has a score significantly higher than the second country in the ranking, **China**. **Brazil** and **Turkey** follow both with an equal score.

For 29 of the countries covered in the database, there are virtually no import and export restrictions or local content requirements for the commercial market affecting digital trade. The average country score for quantitative trade restrictions is therefore relatively low, equal to 0.25.

As mentioned, **Argentina** ranks first in this chapter. The Decree 2646/2012 prohibits the import of several used capital goods including product lines concerning electrical machinery and equipment. For those used capital goods that may be imported, compliance with strict conditions is required (e.g. used capital goods can only be imported by the end user) and high taxes are charged which amounts to 28 percent in the case of existing local production and 14 percent in the absence of existing local production.

Moreover, Argentina instituted a ban on the sale of foreign-made smartphones which affected, for example, Samsung and BlackBerry smartphones as well as Apple iPhones. In order to avoid the sales ban, companies must build a factory in the country or partner up with a licensed domestic company. Additionally, it has been reported that importers are required to undertake certain trade restrictive commitments such as limiting their imports, balancing imports with exports, increasing the local content of the products they manufacture in Argentina, and not transferring benefits abroad and/or controlling prices. It has also been found that non-automatic import license approvals act as a trade restriction in Argentina. The approvals, which also affect electronics, face significant delays and some companies wait more than a year to obtain import licenses.

In **China**, which ranks second in this chapter, there is a non-automatic import licensing procedure for certain chemicals, machinery and electrical goods (MOFCOM Notice 97/2013). In addition, the Tariff Execution Plan 2014 foresees that 10 non-complete taxable-item information technology products shall continue to be subject to customs inspection management. Apart from these measures, it has been reported that China imposes local content requirements on information and telecommunications equipment used by the banking sector. China is also one of the few countries which have export restrictions in place. The country limits exports of advanced drones and supercomputers for national security reasons and it imposes a series of export restrictions that include export duties and export quotas on selected raw materials used to produce smartphones and batteries.

Brazil and Turkey both rank third in this chapter. **Brazil** has an import ban in place that prohibits imports of used consumer goods, including ICT products. Furthermore, concerns have been raised about Brazil's import authorisation system RADAR. According to the RADAR system, importers need to possess a license in order to import goods into Brazil and the application process for the more permissive import license are reportedly lengthy and burdensome.

**Turkey** applies an import ban on IT products manufactured before the year 2000 and used IT equipment cannot be imported "unless the IT equipment is an integral part of a manufacturing machine". In addition, import licenses are required for certain digital products that need after-sales services such as photocopiers

[11] LCRs applied on the government procurement market are included in the government procurement chapter. See Chapter 3.

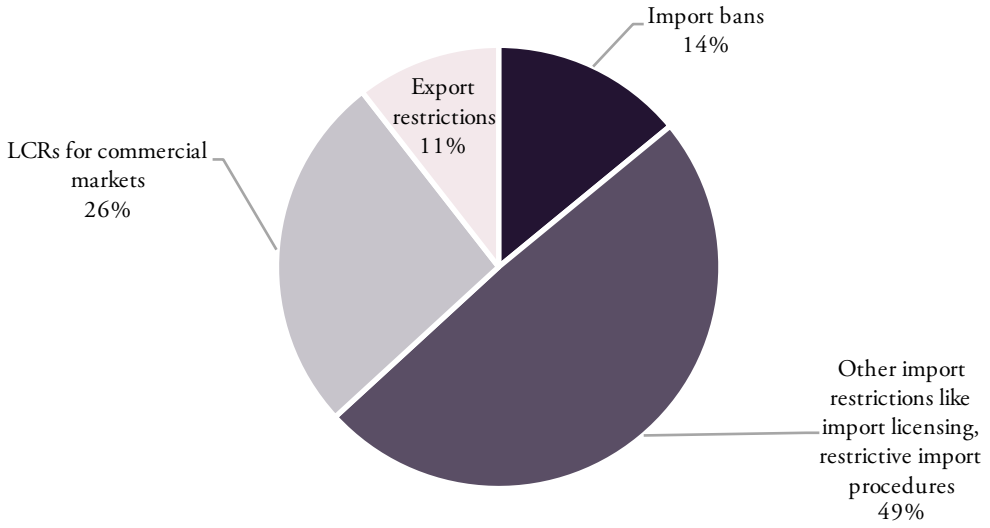
and advanced data processing equipment. Also, concerns have been raised about the lack of transparency in Turkey on its import licensing system, which can lead to delays and additional charges.

## OVERVIEW OF MEASURES

Figure 3.8 provides an overview of the measures covered as part of this chapter. Only 14 percent of all measures found are direct import bans or measures with similar effect. There are a total of eight import bans in the database, imposed in Argentina, Brazil, Hong Kong, Pakistan, Turkey, and Vietnam. This low number is not surprising as bans and quotas are prohibited under Article XI of the General Agreement on Tariffs and Trade (GATT).

In addition, export restrictions form another small part of this chapter, representing 11 percent of the measures. The largest shares of trading restrictions are comprised of LCRs (26 percent) and other import restrictions, such as import licensing procedures and other burdensome import procedures (49 percent). Most of these measures are sector or product-specific and are applied to a wider product group which also includes electronics, electrical machinery or ICT products.

**Figure 3.8:** Share of Quantitative Restrictions by Type (%)




Source: ECIPE; authors' calculations.

## LOCAL CONTENT REQUIREMENTS

Over a third of all countries apply local content requirements for the commercial market. Most of the LCRs found are sector or product-specific and apply to items such as the radio and television sector, on-demand audiovisual services, ICT-equipment such as radios, televisions, and cellular phones, electronics and electrical appliances, or specific products such as smartphones.

LCRs on digital products were found in different forms. For example, as part of a policy of import substitution, Ecuadorian officials reportedly seek commitments from companies to increase local production and decrease imports, which also affect products such as telephones, TVs, electronics and electrical appliances. Other regulations in Indonesia require telecommunication operators to spend a minimum of 50 percent of their total capital expenditures for network development on locally sourced components or services, or mandate the use of at least 30 percent local components by January 2017 in 4G smartphones distributed in Indonesia.

In Nigeria, the Guidelines on Nigerian Content in the ICT-sector require that original equipment manufacturers maintain at least 50 percent of local content by value either directly or through outsourcing to local companies. This also applies to the build-out of mobile telephony infrastructure including cell sites and cell towers. Furthermore, all ICT-companies are required to submit a Local Content Development Plan, to use only locally manufactured SIM cards for the provision of data and telephony services and are also required to source at least 50 percent of value added services locally from a Nigerian company.

## EXPORT RESTRICTIONS

Export restrictions are the least frequently used type of trading measures in this chapter. These measures have been found in China, the EU, India, Israel, and the United States. These export restrictions target mainly dual-use items or other products of national security concern, which also cover electronics, computers, telecommunication items and high-performance computing technologies or technologies that use certain types of encryptions.

### 3.4.2 Chapter 12: Technical Standards

Standards form a set of criteria that can secure and facilitate the interoperability of goods and services. While global standards facilitate trade by avoiding duplication of testing across borders, certain countries implement additional standards which go beyond internationally agreed ones and therefore represent a restriction for trade. As a result, trade of digital goods and services can be hampered or blocked as a result of these measures.

The implementation of restrictive standards is not as common as other measures presented in the database. About half of the countries in the database do not have any restriction imposed in this area, while only **China** has a score above 0.50. After China, the most restrictive country is **India**, followed by **South Korea** and **Vietnam** with equal scores.

The score of **China** is justified by several measures. It is reported that the Chinese government drafts the national standards without any foreign or public input. Even if foreign companies are involved in the drafting process, they do not have a voice or vote when the technical committees actually vote on a draft standard. The Chinese government has also supported the development of mandated domestic radio frequency identification (RFID) standards, without international participation or consensus, despite the fact that global standards for RFID already exist.

There are also reported concerns about duplication of safety certification requirements, particularly for radio and telecommunications equipment, which result in increased costs and a slow-down of product introduction in the market. Moreover, China's current certification requirements for telecommunications equipment are reported to be in conflict with its WTO obligations of limiting imported products to no more than one conformity assessment scheme and of requiring the same mark for all products (Article 13.4(a) of China's WTO Accession). China has three different licensing regimes, namely the Radio Type Approval (RTA), the Network Access License (NAL) and the China Compulsory Certification (CCC).

China is also increasingly developing and mandating national algorithms for its encryption technology that differ from global standards. These standards are developed in technical committees that are closed to foreign participation. The country has several restrictions in place related to encryption standards. First of all, a locally developed encryption standard (WAPI) is required to be used in all wireless equipment despite existing international standard IEEE 802.11i. Second, the Ministry of Industry and Information Technology (MIIT) in concert with the State Encryption Management Bureau informally announced in early 2012 that only domestically developed encryption algorithms such as ZUC would be allowed for use in the network equipment (i.e. mobile base stations) and mobile devices comprising 4G TD-LTE networks in China.

In addition, an industry analysis published by MIIT suggests that burdensome and invasive testing procedures, such as source code reviews, could be required, therefore threatening companies' sensitive intellectual property.

Finally, imported and exported encryption products must be certified by the Office of State Commercial Cryptography Administration (OSCCA). The use of encryption products without OSCCA certification is prohibited, regardless of public, commercial or individual nature of use. However, it is reported that in practice only Chinese or Chinese-owned companies are eligible for OSCCA certification to sell, produce and carry out R&D for encryption technology in China as well as to gain product licensing in China.

**India** ranks second in this chapter. In India, there is a mandatory testing procedure by Indian laboratories for conformity to Indian standards applied to several electronic devices including laptops, tablets, printers, scanners, and wireless keyboards. India does not accept foreign test reports issued by laboratories approved under the internationally-supported IECEE CB Scheme. This requirement results in duplicative in-country certification of the electronics devices that online retailers offer for sale.

Moreover, since 2011, the rules on security clearance for telecom equipment require that Telecom Service Providers (TSP) have to apply for prior security clearance to the Indian Department of Telecommunications before buying any equipment/software. Only resident trained Indian nationals can be employed as executives responsible for certain security checks. There is also a possibility of extensive inspections of hardware, software, design, development, and manufacturing facilities as well as supply chains that might jeopardise intellectual property rights. High fines are imposed in case of non-compliance.

Finally, the Indian government is reported to block purchases of telecoms equipment from Chinese vendors on the grounds of national security. The Department of Telecommunications amended its license conditions for mobile service providers requiring them to submit all plans for procurement of telecoms equipment from foreign vendors for screening and "security clearance" purposes. Although the amendment did not single out China, it is reported that in practice security agencies have been blocking applications involving Chinese vendors.

South Korea and Vietnam both rank third in this chapter. **South Korea** adopts a mix of national and international standards and there are some examples of ICT standards where the national standard has been given priority treatment. For example, it is reported that the Korean government has supported the development of mandatory domestic RFID standards, without international participation or consensus, despite the fact that global standards for RFID have long-existed.

In addition, there are some restrictions on certification for several digital goods including computers, vehicle equipment, radio equipment and broadcasting reception devices, which must be tested in an independent laboratory and the importer must register test results on Korea's National Radio Research Agency (RRA) website. In addition, telecommunications equipment requires type approval by the RRA division of the Korea Communications Commission (KCC).

Finally, in South Korea, there are security verification requirements for government procurement. The government requires that products certified at a Common Criteria Recognition Arrangement (CCRA) accredited lab outside of Korea must undergo an additional security verification process for every procurement, even when it is the same product being purchased by the same government customer. In contrast, products that are certified at a CCRA accredited lab in Korea are exempt from this additional security verification process.

In **Vietnam**, there is no ICT standards agency responsible for the development of ICT standards at the national level and it is reported that there is not a forum where operators can discuss and combine standards before submitting to the regulator to issue technical regulations. Moreover, it is reported that legacy standards are based on national standards and many are still in use. This creates problems of clarity, especially for foreign companies.

Finally, products such as desktops, laptop and portable computers, servers, PDA, routers, switches, hubs, gateways, optical transmission equipment, technical equipment, etc., are subject to certification and/or declaration procedure. The procedure has to be performed in Vietnam or in one of the 57 foreign testing laboratories recognised by the Ministry of Information and Communications under the APEC-Tel Mutual Recognition Agreement for supporting certification and declaration activities.

### PRODUCT SCREENING AND ADDITIONAL TESTING REQUIREMENTS

Several countries in the database impose additional product screening and testing requirements on top of the usual safety certifications. For example, in Brazil virtually all testing for IT/Telecom equipment, which includes everything from mobile phones to optic cables, should be done physically in Brazil. In Canada, the Technical Acceptance Certificate (TAC) is required for several products including mobile phones. In Chile, testing and certification for electrical products has to be done in the country by an accredited and recognised testing laboratory.

As reported above, in China there are three different licensing regimes for several electrical/electronic products and ICT products. Therefore, for a given piece of equipment, it can cost between USD 30,000-35,000 to test for all three licenses (RTA, NAL, and CCC). In addition, certain standards apply to encryption products.

Other countries imposing similar requirements are Costa Rica, Ecuador, Germany, Hong Kong, India, Indonesia, Israel, Japan, Mexico, Nigeria, Pakistan, South Korea, Taiwan, Turkey, the United Kingdom and also Vietnam.

### BAN ON THE GROUND OF NATIONAL SECURITY

Only two countries in the dataset have gone so far as to ban certain products from the commercial market on the grounds of national security. These countries are India and Pakistan. As reported above, the Indian government blocks purchases of telecoms equipment from Chinese vendors on national security grounds. In Pakistan, the national telecom carriers were ordered to cease offering services that route email through BlackBerry Enterprise Server (BES) starting from December 2015. One of the services of BES is email encryption, which prevents tracking of the origin and messages sent through it. Security concerns and lack of Pakistan's capabilities for decryption have been cited as the reason behind the decision. In addition, as reported in the chapter on public procurement, China and the United States ban certain products from public procurement on the grounds of national security.

### 3.4.3 Chapter 13: Online Sales and Transactions

The steady increase in online sales and transactions over the years in both developed and developing countries shows how critical these flows have become for digital trade. UNCTAD (2015) estimated that the value of global e-commerce regarding business-to-business (B2B) exceeded USD 15 trillion and that of business-to-consumer (B2C) is around USD 1.2 trillion in 2013. In Asia and Africa, the B2C part of e-commerce is rapidly growing, while China appears to be one of the biggest players in this area nowadays. Therefore, restrictions on online sales and transactions, including those related to e-payment and domain names, are included in our analysis.

The index score of this chapter goes from 0 to 0.70. Among all the countries taken up in the database, there are 10 countries that have an overall score of restrictions that is equal to or higher than 0.50, indicating significant restrictions in place. **Vietnam** ranks first in this chapter, followed by **Argentina** and **Indonesia**. Other countries with a score above 0.50 are Brazil, China, France, Taiwan, Russia, Germany, and South Korea. The average level of restrictiveness in this chapter is 0.28.

There are several measures that justify the position of **Vietnam** being at the top of the ranking for this chapter. Decree No. 52 of 2013 sets out strict formal requirements for websites that offer online platforms for other traders and for auction platforms. The Decree only applies to companies that use a ".vn" domain or which are registered in Vietnam. The requirements include issues such as registering and becoming certified by the Ministry of Industry and Trade (MoIT).

Another restriction concerns the area of express delivery, in which Decree No. 157 of 2004 sets up a license for foreign firms that want to provide postal services. In addition, according to Decree No. 90 of 2008, advertising service providers that use e-mail advertisement or internet-based text messages are required to send e-mails from a Vietnamese domain name operated from a local server. Finally, Decree No. 72 of 2013 sets out that foreign entities that provide online gaming services to users in Vietnam must establish a local enterprise in accordance with the Decree and the foreign investment regulations of Vietnam. Therefore, cross-border provision of such services is not allowed.

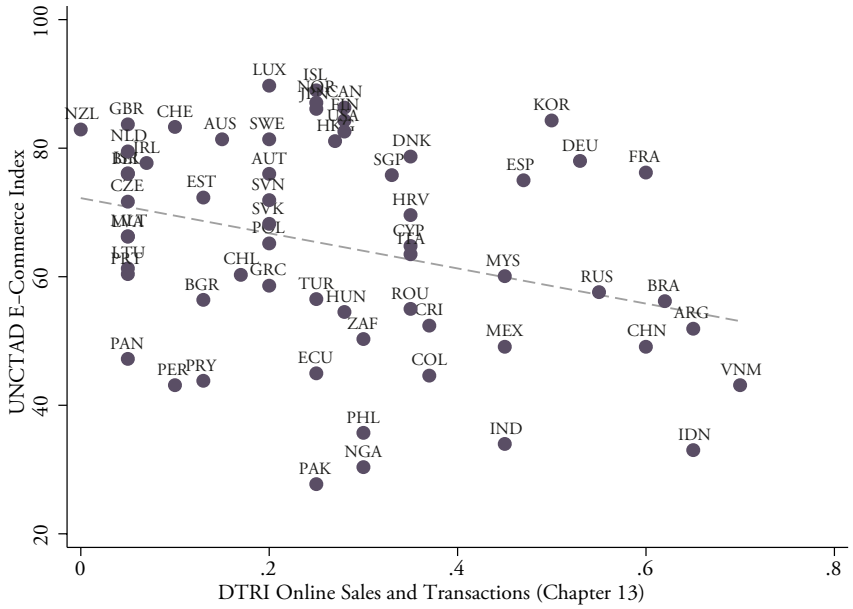
**Argentina** ranks second in this chapter, with several measures restricting online sales and transactions in the country. It is reported that an extra tax of 50 percent of the value is applied to online purchases of foreign products that have a value of up to USD 3,000 and are delivered through Argentina's official postal service (EMS). Once per year individuals may import goods of a value up to USD 25 duty-free, but total mail order transactions via EMS are limited to only two per year per individual. For any other order, there is no minimum value below which the good is exempted from duties and taxes collected by the customs. In fact, Argentina has no de minimis rule. In addition, General Resolution 3570 requires goods delivered by official mail to be retrieved in person at the post office or customs authority, which means that home delivery is prohibited.

In **Indonesia**, which ranks third in this chapter, online retailing and post retailing are completely closed to foreign ownership whilst foreigners are not allowed to own more than 49 percent of express delivery services. Moreover, foreign suppliers are required to limit their activities to provincial capitals with international airports and seaports. It is important to note that websites are considered electronic systems, and as such, they need to get certified before registering for a domain name. Websites must also provide the identity of the party providing such an electronic system and information on the object of any transaction.

The DTRI of Online Sales and Transactions shows a clear pattern in which countries that are more restricted in this field are also the ones that are less ready to capitalise on e-commerce trade. Figure 3.9 shows the DTRI score of this chapter on the horizontal axis whilst plotting the UNCTAD's e-commerce index on the vertical axis, which measures a country's enabling environment for e-commerce.[12] The figure shows that higher restrictions on online sales and transactions are associated with a weaker enabling environment for e-commerce.

[12] For instance, this index compiles information measures such as the share of people having credit cards or internet access that allow people to make transactions which, among other measures, enable e-commerce trade.

**Figure 3.9**: DTRI Chapter 13 Index Score and UNCTAD's E-commerce Index




Source: ECIPE and UNCTAD; authors' calculations.

## RESTRICTIONS ON DELIVERY SERVICES

Online sales of goods are dependent on efficient delivery services. In fact, restrictions on such services would either reduce the number of actors that e-retailing companies can use to deliver their products or might also prevent them from providing their own delivery services.

Several countries in our sample restrict online sales by imposing extra charges, licensing requirements and other restrictions on the provision of such services. As noted above, Vietnam requires foreign businesses to have a license in order to operate post or mail delivery, while Argentina has an extra tax applied to online purchases of foreign products that have a value of up to USD 3,000 and are delivered through Argentina's official postal service.

Another restriction in this area is found in Indonesia, which imposes a maximum share of 49 percent for foreign investment in express delivery services. Other burdensome situations include the case of Brazil, where there is a duty fee of 60 percent for all goods imported through the Simplified Customs Clearance process used for express delivery shipments. There are also value limits for imported and exported goods sent through express services, which amount to USD 5,000 for exports and USD 3,000 for imports.

In China, it is found that the administrative licensing for express delivery services is non-transparent and burdensome. The operation permit for express delivery, which is required under the Postal Law and other regulations, is reported as a serious bottleneck that prevents competition. For example, since companies are required to apply for the permit to each city where there is a postal administration department, they need to go through at least 350 reviews and approval processes if they want to operate at the national level.

Another case is Russia, where it is reported that new procedures introduced in 2014 were so burdensome that they caused DHL and FedEx to stop express delivery. Finally, Thailand has a special tax of around USD 1 for the delivery of documents that weigh up to 2kg.

## DOMAIN NAME REGISTRATIONS

Being able to register a website with a national domain is important for businesses doing e-commerce. Yet, certain countries impose restrictions such as the need to have a physical presence in the country, which can be a local establishment or citizenship. This is the case in Argentina, Australia, Brunei, Croatia, Cyprus, France, Italy, Malaysia, Norway, Slovakia, South Korea, and Thailand. In other cases, a local representative or contact is required. This is the case of Brazil, Bulgaria, Canada, Chile, Estonia, Finland, Germany, Hungary, Paraguay, Singapore, and the United States.

Special cases are found in Brunei, China, and Indonesia. In Brunei, foreign companies or businesses may register for ".bn" and "com.bn" domains only if they have a registered trademark with the Registrar of Trademarks. Foreigners are allowed to register a trademark but must provide an address for service in Brunei.

In China, the requirement is stricter because all domestic and foreign websites are required to apply for an Internet Content Provider (ICP) license to operate their website in China. Without an ICP number, a website can be shut down by the hosting provider with no notice. Local establishment is also required.

As noted above, in Indonesia websites are considered electronic systems and as such, they need to get certified before registering for a domain name. Websites must also provide the identity of the party providing such an electronic system and information on the object of any transaction.

In addition, there are four cases in which the use of a certain domain is required in order to operate in a certain sector. In Brazil, online pharmacies need to have a "com.br" domain. In Greece, online gambling sites must have a ".gr" domain. In Nigeria, the guidelines on Nigerian content in the ICT-sector require the ICT-service providers to use a ".ng" domain name. Finally, according to the Vietnamese Decree 90 of 2008, advertising service providers that use email advertisements and internet-based text messages are required to send emails from a Vietnamese domain name website (i.e. ".vn"), which is operated from a server located in Vietnam.

# Chapter 4
# Methodology

This section sets out the methodology of how the DTRI has been developed. The DTRI applies a score for each country's digital trade policy framework and measures these digital trade policy measures in terms of their trade cost restrictiveness.

Assigning this country score increases transparency about countries' policy frameworks regarding digital trade and facilitates policy makers, researchers, an analysts to uncover policy patterns across countries in the world economy. The DTRI allows for a ranking of countries as presented in Section 3.

The overall DTRI ranges from 0 (i.e. completely open) to 1 (i.e. virtually restricted) with increasing values representing higher levels of digital trade restrictions, i.e. costs for digital businesses. Together the index covers more than 100 different categories of policy measures.

The overall DTRI is comprised of an unweighted (i.e. simple) average of the four clusters across which the thirteen chapters are categorised. In turn, each cluster itself is a weighted average of the chapters belonging to that cluster.

Furthermore, all 13 chapters themselves are also comprised of a weighted average across their subchapters, which contain the actual policy measures that belong to a sub-category. As such, the overall DTRI uses a sophisticated approach for measuring the final country score.

This section of the report outlines the weighted methodology of the DTRI. It presents the criteria used to identify a restrictive measure and to assign a score for each of these measures.

The underlying rationale for including any measure is based on the following criteria: (i) they create a more restrictive regime for online trade versus offline trade, (ii) they imply a different treatment between domestic and foreign providers of digital goods and services and (iii) they are applied in a manner which is excessively burdensome, which means that the measure is considered especially trade-distortive to achieve its non-economic objective.

This section first presents the weighting scheme of the DTRI clusters and clarifies the unweighted aggregation procedure that has been developed to eventually come up with the overall DTRI.

This section then discusses the categories of measures in each of the 13 chapters with their scoring technique and weights assigned across the different types of specific measures. This aggregation procedure, therefore, provides a full explanation of how the overall DTRI has been developed.

## 4.1 DTRI Clusters

The overall DTRI is divided into four clusters. Each cluster regroups chapters together according to a common framework to which the various trade policies belong. They are (A) Fiscal Restrictions; (B) Establishment Restrictions; (C) Restrictions on Data; and finally (D) Trading Restrictions.

Each cluster index is made up of the index scores of the appropriate chapters and is then multiplied by the weights which are assigned to each chapter. The weights, which reflect the relative importance of each chapter within a cluster, sum up to 1 (i.e. 100 percent) within each cluster. As with the overall DTRI score, values of the cluster indexes vary between 0 (i.e. completely open) and 1 (i.e. virtually restricted).

### CLUSTER A: FISCAL RESTRICTIONS

Cluster A groups together Chapters 1, 2 and 3, which are respectively Tariffs and Trade Defence, Taxation and Subsidies, and Public Procurement policies.

Table 4.1 provides the weights that are applied to each of these chapters to come up with the cluster index. Both chapters of Tariffs and Trade Defence and Public Procurement measures receive similar weights as they are found to be of equal importance regarding digital trade. The chapter on Taxation and Subsidies obtains a slightly lower weight since this chapter has a comparably lower distorting effect on digital trade.

**Table 4.1**: Weights Applied to Cluster A – Fiscal Restrictions

| Chapter | | Weighting |
|---|---|---|
| 1 | Tariffs and trade defence | **0.40** |
| 2 | Taxation and subsidies | **0.20** |
| 3 | Public procurement | **0.40** |

### CLUSTER B: ESTABLISHMENT RESTRICTIONS

Cluster B groups together Chapters 4, 5, 6 and 7, which are respectively Foreign Investment, Intellectual Property Rights (IPRs), Competition Policy as well as Business Mobility.

Table 4.2 gives an overview of how much each chapter counts in this cluster area of Establishment Restrictions. The weights are allocated in such way that Foreign Investments, IPRs, and Competition Policy receive equal weights, but Business Mobility of digital service suppliers is given a lower importance within this grouping as most of the measures related to Business Mobility are of a horizontal nature and only indirectly impact digital trade.

**Table 4.2**: Weights Applied to Cluster B – Establishment Restrictions

| Chapter | | Weighting |
|---|---|---|
| 4 | Foreign investment | **0.30** |
| 5 | Intellectual Property Rights | **0.30** |
| 6 | Competition policy | **0.30** |
| 7 | Business mobility | **0.10** |

## CLUSTER C: RESTRICTIONS ON DATA

Cluster C groups together Chapters 8, 9 and 10, which are Data Policies, Intermediate Liability and, finally, Content Access. All these chapters contain restrictions regarding the use and cross-border flow of data across countries.

Table 4.3 provides an overview of how much weight each chapter receives in this cluster. The weights are allocated in such a way so that measures as part of the Data Policies chapter receive the highest weight since these are considered to create the most costly restrictions on digital trade. In fact, this chapter covers issues such as data localisation which can result in a serious restriction for businesses to operate cross-border and in some cases even make it impossible. However, the chapters of Intermediate Liability and Content Access receive only slightly lower weights indicating their high importance as well.

**Table 4.3**: Weights Applied to Cluster C – Restrictions on Data

| Chapter | | Weighting |
|---|---|---|
| 8 | Data policies | **0.40** |
| 9 | Intermediary liability | **0.30** |
| 10 | Content access | **0.30** |

## CLUSTER D: TRADING RESTRICTIONS

Cluster D groups together Chapters 11, 12 and 13, which are the chapters of Quantitative Trade Restrictions, Standards and Online Sales and Transactions respectively.

These three chapters contain restrictions regarding the movement of goods and services across borders with Chapter 13 focusing on *the way* in which goods are traded over the internet. Table 4.4 provides an overview of the weight across the three chapters, which is equally shared.

**Table 4.4**: Weights Applied to Cluster D – Trading Restrictions

| Chapter | | Weighting |
|---|---|---|
| 11 | Quantative trade restrictions | **0.33** |
| 12 | Standards | **0.33** |
| 13 | Online sales and transactions | **0.33** |

## 4.2 DTRI Chapters

This section provides further explanation on the methodology with which categories of measures are covered by each chapter, including their weights. Within each chapter, weights are also given to each subchapter containing measures which, in addition, also sum up to 1 (i.e. 100 percent). As said, similar to the overall DTRI and the cluster indexes, values of the chapter indexes vary between 0 (i.e. completely open) and 1 (i.e. virtually restricted).

### 4.2.1 Chapter 1: Tariffs and Trade Defence

Chapter 1 covers two types of traditional trade measures that affect ICT goods and their inputs, namely tariffs and trade defence measures.

Import tariffs are duties applied at the border for imported goods and they can shield domestic goods from external competition. Although tariffs have generally been reduced over the past decades, some tariffs still remain and apply to digital goods. In fact, in some cases, duties on ICT products are still high and therefore act as a costly trade restriction for some countries (WTO, 2015a).

Trade defence measures are applied by countries in order to protect their domestic producers from international trade distortions. Trade defence measures consist of (a) anti-dumping duties, (b) countervailing duties, and (c) safeguard measures. In all three cases, they allow governments to charge duties so as to address specific concerns arising from dumping, trade-distorting subsidies, and import surges.[13]

#### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 1 is divided into two subchapters dealing with tariffs and trade defence measures, as outlined in Table 4.5. This table also shows the relative importance that is given to each of the subchapters in the overall chapter index by allocating different weights.

Since import tariffs affect trade on a permanent basis whilst trade defence measures are applied only by exception and on a temporary basis, a higher weight is given to Subchapter 1.1 of 80 percent against Subchapter 1.2, which accounts for 20 percent as part of the overall chapter score. Table 4.5 also provides weights that have been applied for each measure which is taken up within both subchapters.

[13] Note that a safeguard measure can also take place in the form of quantitative (import) restriction thereby limiting the quantity of foreign goods that can be imported.

**Table 4.5**: Subchapters and Weights for Chapter 1

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **1.1** | **Applied tariffs on ICT goods and their inputs** | | **0.8** |
| | 1.1.1 | Average applied MFN tariff | 0.2 |
| | 1.1.2 | Weighted average applied MFN tariff | - |
| | 1.1.3 | Maximum tariff rate | 0.2 |
| | 1.1.4 | Coverage rate of zero-tariffs | 0.4 |
| | 1.1.5 | Signatory of ITA I | 0.05 |
| | 1.1.6 | Signatory of ITA II | 0.05 |
| | 1.1.7 | Other restrictive or discriminatory tariffs practises | 0.1 |
| **1.2** | **Anti-dumping, countervailing duties and safeguards on ICT goods and their inputs** | | **0.2** |
| | 1.2.1 | Anti-dumping measures | 0.8 |
| | 1.2.2 | CVD measures | 0.1 |
| | 1.2.3 | Safeguard measures | 0.1 |

### APPLIED TARIFFS ON ICT GOODS AND THEIR INPUTS

The selection of tariff lines that are included in the DTE database is based on Lee-Makiyama (2011), which proposes an expansion of the product coverage of the WTO Information and Technology Agreement (ITA). This expanded list of ICT goods and their inputs includes a list of 4 and 6-digit HS codes and is used as a template in the DTE database in which the corresponding tariff lines are employed for our tariff analysis. The tariff rates are downloaded from WITS using the UNCTAD TRAINS database within the Tariff and Trade Analysis entry.

The tariff rates in Subchapter 1.1 correspond to the latest available tariff years, which range from 2011 to 2014 depending on the country at the time of our analysis. All tariff rates are on the basis of Most-Favoured-Nation (MFN) of each reporting country to the rest of the world and therefore preferential rates are excluded.[14] Applied MFN rates were chosen rather than bound as the former reflect the *de facto* level of trade restriction faced by foreign exporters in a certain country.

In the tariff analysis, four dimensions have been examined, namely (i) simple average MFN rate applied, (ii) weighted average MFN rate applied, (iii) the maximum tariff rate applied, and finally (iv) the coverage rate of zero tariffs.

The simple average applied MFN rate is calculated by adding all applied tariff rates based on our list of extended ICT goods and their inputs and by dividing them by the number of tariff lines. This provides a general understanding of the average tariff rate and is, therefore, included in the index.

However, as the simple average does not account for the relative importance of digital goods in terms of their trade volumes, the database also includes the weighted applied MFN tariff rate. The latter corrects for this relative importance through weighing the tariff rate by the share of the trade volumes of each tariff line so that tariffs of a digital good which has a higher trade volume account for relatively more. Yet, weighted tariff averages also have the disadvantage that, if trade flows are low, or no trade flows for a tariff line exists, the weight assigned would be artificially low. In that case, it is unclear if the tariff is causing the low trade volumes or not. Therefore, the weighted applied MFN rate is taken up in our database, but, as Table 4.5 shows, this measure is not included in our index and its weight is set at zero.

[14] Considering the large number of countries covered by the DTE database it was not possible to consider in addition preferential tariff rates resulting from preferential bilateral or regional trade agreements.

All scores for the applied tariffs (i.e. measures 1.1.1, 1.1.3 and 1.1.4) are based on a linear function. For the average MFN rate, this is (f(x) = 0.1x), which enables to express the tariff average on a scale from 0 to 1 up to a tariff average of 10 percent. When a country has a tariff of 10 percent or higher, instead, it receives a score of 1. This is because a rate of 10 percent is considered a threshold above which a country has a significant level of restriction on the trade of digital goods.

The maximum tariff rate is a country's tariff peak across its tariff lines in digital goods and the score for this entry is also based on a linear function, namely (f(x) = 0.0333x). This gives a score between 0 and 1 for a maximum tariff outcome up to 30 percent and 1 for an outcome above such threshold.

In these two tariff structures, and in the calculation of weighted applied MFN tariff rate, only ad valorem duties are included.[15] Nonetheless, in order to take account of the non-ad valorem duties in digital goods, Chapter 1 also includes the coverage rate of zero tariffs on ICT goods. This is because a coverage ratio reflects the percentage of tariff lines which are duty-free and would hence not be affected by either ad valorem nor by non-ad valorem duties.

The coverage rate of zero-tariffs is computed as the number of free tariff lines divided by the total number of tariff lines, multiplied by 100. The actual score also follows a linear function, which is (f(x) = -0.025x + 1.75). According to this formula, the score assigned varies between 0 and 1 for a coverage rate ranging between 30 and 70 percent. When the coverage rate is 30 percent or below, then the country receives a score of 1. Finally, for coverage rates of 70 percent or higher a score of 0 is applied, as in that case most of the goods have zero-tariffs.

Of note, the score for the coverage rate of zero-tariffs receives the highest weight in this subchapter, as shown in Table 4.5. The reason is that it is believed to have the most significant impact on trade flows as even small tariffs can already have significant trade-distorting effects in ICT goods.

Besides applied tariff rates, this subchapter also includes a scoring on whether countries are signatories to the WTO's ITA agreement of 1996 and its expansion in 2015, i.e. ITA I and ITA II, respectively. The ITA I requires participants to eliminate and bind customs duties to zero on an MFN basis for a list of specified ICT goods, whilst ITA II requires countries to agree on an expanded product coverage. Countries which have not signed up for either agreement are expected to have, on average, higher tariff rates in ICT goods and therefore receive a score of 1 for both entries of ITA I and II.

Finally, any complaints about other restrictive or discriminatory tariff practices are also accounted for by giving a score of 1 to countries in which such practices take place.

### ANTI-DUMPING, COUNTERVAILING DUTIES AND SAFEGUARD MEASURES

The analysis of the trade defence measures in this chapter uses the same basis for defining ICT goods and their inputs as for the previous subchapter. In other words, this subchapter also makes use of the expanded list of ICT goods using the 4 and 6-digit HS codes from Lee-Makiyama (2011). Moreover, the database also includes trade defence measures on products, materials and chemicals that do not explicitly appear on this expanded list of digital goods, but which do nonetheless serve as an essential input or intermediate good for producing digital products.

For each of the three categories of trade defence measures, a country receives increasing values of scoring depending on the type of the affected goods. A score of 0.3 on a scale from 0 to 1 is given if a country has at least one measure in place that affects inputs or intermediate goods typically used in ICT manufacturing, such as chemicals or metals. A score of 0.8 is given to countries which have at least one measure in place affecting a good which constitutes a part or component of an ICT product, such as transistors, wiring or casing goods, or which is an elaborated intermediate good necessary to provide a digital service. Finally,

[15] Countries rarely apply non-ad valorem duties in sectors outside agriculture. See ITC-UNCTAD-WTO (2013).

a country receives the highest score of 1 if it applies at least one trade defence measure of an ICT device, machinery or any finalised digital item.

In addition, a country also receives a score of 0.8 if it applies two or more measures within the foregoing first category regarding inputs or intermediates. Similarly, a score of 1 is given to countries which apply two or more measures within the foregoing second category regarding non-finalised items or if it is an elaborated intermediate good necessary for providing a digital service. The distinction between an intermediate input, a non-finalised item and a final digital good or ICT device is evaluated on a case-by-case basis.

Regarding weights assigned to anti-dumping measures against countervailing duties and safeguard measures, the former category receives the highest weight since these measures have a significant trade-distorting effect. Countervailing duties and safeguards share equal weights.

## SOURCES

The main source used for the tariff rates are the UNCTAD TRAINS database via WITS. For the trade defence measures, the WTO Notifications at the respective WTO Committees on Anti-dumping, Subsidies, and Safeguards were consulted. Moreover, for both subchapters, the Global Trade Alert (GTA) database and the Market Access Database of the European Commission were also used as well as the reports on foreign trade barriers issued by the Office of the United States Trade Representative (USTR). Additionally, the reports on Potentially Trade-restrictive Measures issued by the European Commission were also consulted.

### 4.2.2 Chapter 2: Taxation and Subsidies

Chapter 2 focuses on the regulatory measures with regards to the areas of taxation and subsidies in the digital economy.

Discriminatory taxation and subsidies represent a burden for businesses in terms of additional costs in doing business, which are eventually passed on to the end-consumer. Taxation has long been a competence solely granted to national states, and it has turned out to be even more of a sensitive issue with the rise of digitalisation.

Moreover, since there could be a lack of harmonisation amongst domestic practices in this area, certain taxation and subsidy measures can become particularly burdensome for Small and Medium-sized Enterprises (SMEs) as they are faced with different tax regimes. In the end, this could make these SMEs shy away from new markets even if their goods or services are in demand.

#### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 2 is divided into four subchapters, each dealing with a different aspect of taxation and subsidies, as outlined in Table 4.6. The table also shows the relative importance that is given to each of these subchapters in the overall chapter index by allocating different weights. Note that some tax measures in this chapter are not directly trade-distorting as they cover domestic regulatory practices. However, domestic regulations are known to have an indirect impact on trade by affecting domestic as well as foreign suppliers simultaneously.

The DTE database looks explicitly at the discriminatory aspect of the tax and/or subsidies regarding whether they are (i) disproportionately affecting digital goods, products and services suppliers compared to non-digital goods and services as well as (ii) whether foreign digital goods and services suppliers are affected relatively more than domestic suppliers.

**Table 4.6**: Subchapters and Weights for Chapter 2

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **2.1** | **Tax regime on digital goods and products** | | **0.35** |
| | 2.1.1 | Copyright levies | 0.33 |
| | 2.1.2 | Discriminatory taxation of digital goods and products | 0.33 |
| | 2.1.3 | Discriminating taxation of foreign digital goods and products | 0.33 |
| **2.2** | **Tax regime on online services** | | **0.35** |
| | 2.2.1 | Discriminatory tax regime of e-commerce | 0.33 |
| | 2.2.2 | Discriminatory taxation of online services | 0.33 |
| | 2.2.3 | Discriminatory taxation of foreign online services | 0.33 |
| **2.3** | **Taxation on data usage** | | **0.15** |
| | 2.3.1 | Specific tax on data usage | 1 |
| **2.4** | **Discriminatory application of subsidies and tax benefits** | | **0.15** |
| | 2.4.1 | Discriminatory application of tax benefits | 0.4 |
| | 2.4.2 | Discriminatory application of subsidies | 0.3 |
| | 2.4.3 | Discriminatory application of export credits | 0.3 |

Table 4.6 shows that taxation on digital goods and online services are given equal importance by giving each of them a weight of 35 percent. The two remaining subchapters on taxation on data usage and subsidies also receive equal weights, which in this case is 15 percent. Table 4.6 also provides weights that have been assigned for all measures covered within each subchapter. In most cases, they are also equally shared.

## DISCRIMINATORY TAX REGIME ON DIGITAL GOODS AND PRODUCTS

Subchapter 2.1 covers discriminatory practices targeting digital goods and products, while Subchapter 2.2 covers discriminatory practices targeting digital services.

The first measure in this subchapter covers copyright levies. Such levies are government-mandated taxes charged on purchases of recordable media and other devices. This scheme has often been criticised as the purchase of such media and devices is not necessarily linked to private copying and might result in double taxation.

For example, a copyright levy could be applied to the purchase of a computer even if the user is not using the computer for the private copying of copyrighted material. For the purpose of the DTRI, an interval scoring is applied for this measure. That is, if a country does not apply copyright levies, it receives a score of 0. If discriminatory copyright levies are applied on blank, physical storage media such as CD/DVD, cassettes or tapes, it receives a score of 0.5. If instead, these copyright levies are applied on devices such as smartphones, laptops or hard drives in a country, it receives a full score of 1.

The second type of measures covered in this subchapter are cases of discriminatory taxes which are applied against digital goods and products. These measures include cases in which a digital good or product is given a different treatment regarding taxes compared to offline counterparts. For example, there are taxes on e-books which are higher than physical books. They also include cases in which special taxes are levied on digital goods or products which are higher than the average tax rate imposed on other non-digital goods and products. For example, a tax on the sale of SIM cards which are found to be higher than the usual VAT, or a special tax that is levied on revenues from certain digital goods. If any of such or similar discriminatory taxes are applied in a country, it receives a score of 1. Otherwise, the score remains 0.

Regarding the third measure taken up under this subchapter, if the tax regime discriminates against foreign digital goods and products, the country receives a score of 1. If not, the score remains 0.

Of note, given the lack of international agreement on how to classify software, measures related to software are listed in the database under both Subchapters 2.1 and 2.2. However, double-counting for the index is avoided by classifying these measures related to software under Subchapter 2.2 and assigning a score for this subchapter only.

## DISCRIMINATORY TAX REGIME ON ONLINE SERVICES

In a similar manner as Subchapter 2.1, for this second subchapter on services three different measures are formulated. The first measure identifies whether there are any sales tax, VAT or other taxes applied on e-commerce that are higher than general taxes. If this is the case in any of the countries, then a score of 1 is applied. If no such case is found, a score of 0 is applied.

In addition, the second measure takes stock of discriminatory taxes on online services. For instance, in some countries, there has been a special increase in taxes for Internet Service Providers (ISPs) or there are special taxes that are applied on revenues from mobile services. In terms of scoring, if there are any such taxes or other special taxes found to discriminate against online services, this measure receives a 1 and 0 otherwise.

Finally, as in the case of goods and products, if the tax regime of a country discriminates against foreign online services, an additional third measure is included that applies a 1 when this is the case and 0 otherwise.

### TAXATION ON DATA USAGE

The third subchapter captures the distorting effect of tax measures which are applied on the usage of data. Taxation on data usage can be a straightforward source of government revenue. However, such taxation may also severely hamper the possibility to increase telecommunication service deployment in the long run by digital service providers and consumers. It may also limit the chances for users to embrace the further development of the digital field as it could become more expensive to use digital solutions as part of firms' business models or innovation activities. Table 4.6 shows that this subchapter is a stand-alone item with the full weight being allocated. Any measure that is found in this subchapter is given a score of 1, otherwise the score remains 0.

### DISCRIMINATORY APPLICATION OF SUBSIDIES AND TAX BENEFITS

The final subchapter regarding taxation and subsidies accounts for cases in which there is a regime that is more favorable towards domestic suppliers as opposed to foreign suppliers regarding subsidies, tax benefits, and export credits. As such, this subchapter is not specifically targeted at goods and services as in the first two subchapters. For instance, some countries grant tax benefits in the area of digital R&D for domestic producers, which discriminate against foreign-owned producers.

Moreover, this subchapter also looks at whether foreign-owned producers are eligible for receiving any kind of other subsidies in the field of digital economy.

Finally, export credits are also taken into account to see whether domestic producers are more favorably treated in this regard. It is important to note that most of these measures usually apply horizontally to all sectors and therefore also cover the digital economy. As in the previous two subchapters, any measure that is found regarding these items is given a score of 1 and 0 otherwise.

### SOURCES

To determine whether measures and practices regarding taxes and subsidies are discriminatory, the research of this chapter follows the International VAT/GST Guidelines published by the OECD's Committee on Fiscal Affairs. This consolidated report has been recognised as being one of the most accurate guidelines in this field with increasing overall business' compliance in the areas of taxation and tax remittances.

Regarding taxation on data usage, the main source for this subchapter has been the GSMA (GSM Association) reports which have been consulted extensively. For specific domestic legislation, worldwide tax reports from larger professional services and consultancy firms have been used. Finally, national tax laws have been verified as well as to check whether national measures are upheld.

### 4.2.3 Chapter 3: Public Procurement

Chapter 3 considers measures related to public procurement covering both digital products and services.

Public procurement refers to the procurement of goods and services by government agencies or other public authorities.[16] Measures identified in the database take different forms. They vary from preferential treatment in public tenders to domestic goods and services suppliers over foreign suppliers, to more specific policy measures, such as the requirement to surrender patents and source codes or measures mandating the use of certain technologies.

Most of the public procurement measures and practices in this chapter are of a horizontal nature, which means that they apply across all, or at least several, products and services sectors, including digital products and services. However, if policy measures are specifically targeted at non-digital sectors or if non-digital sectors are exclusively listed, then these procurement measures are not taken up in the database and neither in the index.

Note that different regulations and laws are reported as separate entries whereas, if different practices lead to an overall discriminatory regulatory environment in public procurement, they are presented as one measure. Moreover, only procurement measures applied at the national level are covered, which means that if measures are taken by public authorities on a sub-national level (e.g. by federal US states), they fall outside the scope of this analysis.

#### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 3 is divided into three subchapters, each covering a different type of measure as outlined in Table 4.7. They are (i) measures which favour local over foreign suppliers of goods and services, (ii) specific measures that require suppliers to render patent rights related to digital goods and services or source codes in order to participate in tenders, and finally (iii) measures requiring the usage of a certain technology (so-called technology mandate), such as the requirement for suppliers to use a particular type of encryption or specific product standard or format to win tenders.

**Table 4.7**: Subchapters and Weights for Chapter 3

| Subchapter | Items covered | | Weighting |
|---|---|---|---|
| **3.1** | **Preferential purchasing schemes covering digital goods and services** | | **0.60** |
| | 3.1.1 | Exclusion of foreign firms | 0.40 |
| | 3.1.2 | Local content requirements | 0.30 |
| | 3.1.3 | Other restrictive practices | 0.20 |
| | 3.1.4 | WTO Agreement on Government Procurement (GPA) | 0.10 |
| **3.2** | **Requirement to surrender patents, source codes or trade secrets** | | **0.20** |
| **3.3** | **Technology mandate (encryption, product standards or formats)** | | **0.20** |

Overall, relatively more importance is given to the first subchapter of public procurement restrictions as part of the overall chapter index by allocating a weight of 60 percent. The reason is that this subchapter covers a wider range of measures and contains the most prohibitive type of measure, namely bans on bids in public procurement. Subchapters 3.2 and 3.3 receive equally low weights of 20 percent compared to

[16] In many countries, the public procurement market has a considerable economic size by accounting on average for about 10-15 percent of GDP (WTO, 2015b).

Subchapter 3.1 as part of the overall chapter index since these are rather specific types of measures. Table 4.7 also provides weights that have been assigned for all measures covered within each subchapter.

### PREFERENTIAL PURCHASING SCHEMES

The first subchapter contains four different types of measures. The first one takes up bans which are measures that exclude foreign firms from public procurement. Measures which fully exclude these foreign firms from participating in public tenders receive the highest score of 1 as they are most restrictive. As an intermediate score, measures which specify very restrictive conditions upon which foreign firms can participate in bids are scored with 0.5 points. In these cases, a foreign firm is not excluded from public procurement *per se* but is excluded only under certain conditions. As exclusion from public procurement is the most restrictive measure in this chapter, it receives the highest weight of 40 percent.

The second type of measure covers local content requirements applied to public purchasing schemes. These measures require the use of domestically produced goods or services in the supply of the goods and/or services to the public authority. These measures discriminate against foreign suppliers because they specifically necessitate foreign firms to find and integrate local suppliers in their supply chain rather than relying on foreign ones. This measure is less burdensome for domestic suppliers as they face fewer difficulties fulfilling this criterion because of their local supplier networks.

The scoring for this measure reflects the scope of products and services covered. If a local content requirement is horizontal, sectoral or affects a broad range of products (i.e. roughly equivalent to HS 2 and 4-digit levels such as electrical machinery or telephony equipment), a value of 1 is given. If a local content requirement is at the product level (i.e. roughly equivalent to the HS 6-digit level), a value of 0.5 is given. If no local content requirement is found, a score of 0 is applied. Moreover, a score of 1 is also given when at least two measures of a more limited scope of application are applied. These measures can create a serious burden for the foreign companies and they are therefore assigned a weight of 30 percent in this subchapter.

The third type of measure groups any other limitation on the foreign participation of public procurement schemes. They include, for example, preferential price margins for local suppliers in public tenders or measures that put forward certain conditions or special procedures for foreign companies to participate in tenders.[17] They also include the lack of transparency regarding the public procurement process. Since this category of measures is rather diverse, scoring has been done on a case-by-case basis. For any measure that is especially trade restrictive, or could potentially block trade, or when at least two less restrictive measures were found to be in place, a score of 1 is given. If a measure is less trade restrictive (such as price preferences or lack of transparency), it receives a score of 0.50. The weight assigned to this type of measure within the subchapter is 20 percent.

Finally, the last item that is taken up is whether a country is a signatory to the WTO's Government Procurement Agreement (GPA). The GPA ensures access to the government procurement markets of members. For the index, the scoring is based on whether the country is a signatory and whether its commitments also cover the services sectors considered most important for digital trade, namely telecommunication services (CPC 752), telecommunication-related services (CPC 754), and computer and related services (CPC 84).[18] In terms of scoring, if a country is not a signatory of the GPA or if a country has not fully covered the three most relevant service sectors as described, a score of 1 is assigned. Otherwise, the score remains 0. As in the case of other international agreements included in this analysis, the weight assigned to this measure is 10 percent within this subchapter.

[17] Price preferences do not explicitly require the use of domestic content, but nonetheless discriminate against foreign suppliers in the sense that they provide advantages to domestic suppliers of goods and services in case offers from domestic suppliers are more expensive. Giving preferential price margins could therefore guarantee domestic content to be included in the bid.

[18] It was not possible to also include the coverage of goods sectors as these are reported in different classification systems and hence would make it extremely difficult to examine.

### REQUIREMENT TO SURRENDER PATENTS, SOURCE CODES OR TRADE SECRETS

The second subchapter concerns measures that require foreign suppliers to surrender patents, source codes, or other trade secrets in order to win a tender. These measures require foreign companies to disclose items often protected by IPRs. Although these types of measures are not applied frequently, they nonetheless have a significant impact on trade when put in place given that maintaining patent rights or protecting source codes is of high economic importance for a firm. If a country applies a legislative measure of this type, it is given the score of 1. In addition, if there has been a registered complaint about this issue which indicates that such requirements exist, a score of 0.5 is assigned to that country. Otherwise, the score remains 0.

### TECHNOLOGY MANDATE (ENCRYPTION, PRODUCT STANDARDS OR FORMATS)

The last category in this chapter covers those measures that mandate the use of certain technologies such as formats or encryption techniques in order to win a tender. In fact, if a government prescribes the use of specific technologies so as to allow foreign firms to participate in public tenders, it excludes those competitors which do not use these specified technologies or are not able to provide their goods and services under such conditions. In terms of scoring, for any measure or known case with an obligation to use a certain type of encryption, product standard or format, a country receives a value of 1. For those measures which give a so-called preference in a bid to suppliers which use a type of encryption, specific standards or format, a score of 0.5 is given. Otherwise, the score remains 0.

### SOURCES

The main sources used for this chapter are reports on foreign trade barriers issued by the Office of the USTR, the 11th Report on Potentially Trade-restrictive Measures issued by the European Commission in 2014 and the WTO Report on G-20 Trade Measures of 2014. Furthermore, the WTO Trade Policy Review Reports by the WTO Secretariat have been consulted as well as the Country Reports provided by the US Commercial Services. Apart from these reports, the Global Trade Alert (GTA) Database and the Market Access Database of the European Commission were used. Also, reports by business associations and results from web research were taken into account.

### 4.2.4 Chapter 4: Foreign Investment

Chapter 4 covers measures related to foreign investment in sectors considered relevant for digital trade.

Overall, foreign direct investment (FDI) is a key-driver of international economic integration and spans multiple sectors in the digital economy. The investment measures that form part of this chapter are a mix of sector-specific and horizontal measures as well as certain practices.[19] Naturally, the telecommunication sector forms an important part of the sector-specific measures, but computer services, internet publishing services and manufacturing of telecom facilities and other electronic devices are also included.

Although the majority of measures do appear in the telecommunication sector, in some part this may be due to a classification issue. Countries such as China and Vietnam, for instance, consider the provision of internet and internet-related services as a "value-added telecommunication service", which are therefore classified under the telecom sector.

#### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 4 is divided into four subchapters, each covering a different type of measure, as outlined in Table 4.8. They cover (i) restrictions on ownership, (ii) restrictions on the board of directors and managers, (iii) measures requiring a screening of investments and acquisitions, and finally (iv) other measures which are restrictive or potentially trade blocking.

**Table 4.8**: Subchapters and Weights for Chapter 4

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **4.1** | **Restrictions on foreign ownership** | | **0.50** |
| | 4.1.1 | Maximum foreign equity share | 0.7 |
| | 4.1.2 | Joint-venture requirement | 0.1 |
| | 4.1.3 | Minimum capital requirement | 0.1 |
| | 4.1.4 | Quota on number of foreign companies | 0.1 |
| **4.2** | **Restrictions on board of directors and managers** | | **0.10** |
| | 4.2.1 | Nationality or residency requirement for board of directors | 0.7 |
| | 4.2.2 | Nationality of residency requirement for managers | 0.3 |
| **4.3** | **Screening of investment and acquisitions** | | **0.30** |
| | 4.3.1 | Requirement to show net economic benefits | 0.2 |
| | 4.3.2 | Screening on national security | 0.5 |
| | 4.3.3 | Restriction on mergers and acquisitions beyond competition reasons | 0.3 |
| **4.4** | **Other restrictive practices related to foreign investment** | | **0.10** |
| | 4.4.1 | Other restrictive practices related to foreign investment | 1 |

As shown in Table 4.8, more importance is given to the first subchapter of investment restrictions as part of the overall chapter index by allocating a weight of 50 percent. Screening and restrictions on cross-border mergers and acquisitions are given a weight of 30 percent, as they are considered very restrictive, but

[19] As noted in previous chapters, horizontal measures are those that apply across all, or at least several, sectors including digital goods and services.

somewhat less than restrictions on ownership. Measures on the appointment of directors and managers with domestic nationality as well as other measures receive less weight of 10 percent as they do not affect the investment directly. Table 4.8 also provides weights that have been assigned for all measures covered within each subchapter.

## RESTRICTIONS ON FOREIGN OWNERSHIP

This subchapter is divided into four different types of measures, namely restrictions on maximum equity shares, joint-venture requirements, discriminatory minimum capital requirements, and quotas on the number of firms. Moreover, some governments still own or control firms in different parts of the digital economy, particularly in the telecommunication sector. Therefore, we also point out cases in which countries have limitations on shares in government-controlled companies and integrate these cases under the first measure of maximum foreign equity share.

Measures on the share of maximum foreign equity that is allowed for investment are scored using different interval thresholds. Increasing values reflect increasing levels of restrictions. More specifically, a score of 1 is given when there is a complete ban of foreign equity in at least one sector affecting digital trade, which may include a ban to foreign investment in telecommunication services, manufacturing of digital goods, computer and related services, or other digital sectors such as internet publishing. A score of 1 is also given when there are minority stakes in not one but several sectors relevant for the digital economy. Minority stakes represent an equity share lower than 50 percent of a company's equity capital, which is not a controlling stake. A score of 0.8 is given when foreign equity in at least one of the sectors affecting digital trade is limited to a minority stake.

A score of 0.7 is assigned when such minority stakes do not cover the entire sector, but only government-owned enterprises, which therefore forms another intermediate step in the interval. This measure relates to any legal or *de facto* limit on the shares that can be acquired by foreign investors in government-controlled firms in any digital sector. The slight difference in scoring is justified on the grounds that a minority stake in government-owned enterprises has a more limited scope than a minority stake for the entire sector, but nevertheless represents an important constraint as government-owned enterprises often cover a significant size of the market. A score of 0.5 is given when foreign equity has to be limited to any share between 51 to 99 percent in at least one of the sectors as described above. Finally, as said, a score of 0 is given when full foreign ownership is allowed in all these sectors.

The second measure in this subchapter considers the existence of a requirement for firms to engage in joint-ventures in order to invest or operate in a certain country. For this measure, a dichotomous scoring is applied. A score of 1 is given when there is such a requirement in any of the digital sectors in the economy, including the telecommunication sector. A score of 0 is assigned when no such joint-venture requirement is present in any of the digital sectors.

Similarly, the third measure identifies the existence of discriminatory minimum capital requirement against foreign investment and follows a dichotomous distinction in terms of scoring. A score of 1 is given when there is a discriminatory capital requirement in any digital economy sector, including the telecommunication sector. When no discriminatory capital requirements exist in a country, it receives a score of 0.

Finally, the fourth measure taken up in this subchapter are cases when there is a quota system in place that limits the number of firms in any of the aforementioned digital sectors in the receiving country. A score of 1 is assigned when such quota system is in place and a 0 is given in case no such quota system exists.

In Table 4.8, one can see that within this subchapter foreign equity stake limits (including the limit on shares in government-owned enterprises) receive the highest weight of 70 percent compared to the three other measures which each obtain a lower weight of 10 percent.

### RESTRICTIONS ON THE BOARD OF DIRECTORS AND MANAGERS

This subchapter takes stock of restrictions regarding the nationality or residency of members of the board of directors and managers. Both items are separated into two different questions and scored in a dichotomous manner. A score of 1 is given when there is a nationality or residency requirement for the members of the board of directors and for managers, whilst a score of 0 is given when no such requirements are in place for both types of professions. In terms of weighting, a higher importance is given to the board of directors than to the board of managers.

### SCREENING OF INVESTMENTS AND ACQUISITIONS

The third subchapter considers restrictions related to the screening of investments and acquisitions implemented by the recipient country of such investment. Screening procedures create uncertainty for foreign investments and can imply complicated processes that delay the investment procedures. In some cases, these requirements are applied in a discretionary way, in which case they become even more burdensome for the investor.

Two screening measures are covered in this subchapter. The first one is whether the foreign investor is required to show economic benefits of its investment. This requirement can include the need for an increase in local employment as part of the investment or other net benefits for the economy. If such a requirement is in place, this measure receives a score of 1, and 0 otherwise. The second measure covered in this subchapter is a screening on whether foreign investments can impair national security. The scoring of this measure follows a threshold approach. A score of 1 is given when screening policies regarding national security were used at least once to deter foreign investments in digital sectors; a score of 0.3 is given when a general horizontal screening is in place but has never been applied in any of the sectors affecting digital trade; and a score of 0 is given when no screening policies are in place. The reason for including screening policies on the basis of national security is that they have been used in the past and still can be used today to deter investment, especially in the case of telecommunication companies. Such screening might allow the blocking of investments in a discriminatory way.

In addition to screening procedures, foreign investments in the form of mergers and acquisitions can also be subject to restrictions which go beyond the general restrictions for competition reasons. If this is the case, then this measure is included as a separate item in the database and is scored in the index. A score of 1 is given in cases where governments have used merger regulations to deter foreign investments in digital economy sectors. A score of 0.3 is assigned when horizontal merger rules exist but have never been applied in sectors as part of the digital economy. Finally, a score of 0 is given when there are no restrictions on cross-border mergers and acquisitions other than those for competition reasons.

### OTHER MEASURES

Finally, there are some additional measures that restrict foreign investments in digital sectors. They are listed in a separate subchapter and receive a score of 1. For instance, measures related to lack of transparency or certain license requirements are taken up in this section. The assessment of these specific measures is performed on a case-by-case basis.

### SOURCES

The main source used to identify the foreign equity stakes/caps was national legislation related to foreign investments. Other important sources to verify measures related to equity caps included reports by the International Telecommunication Unit (ITU), the World Trade Organization's Trade Policy Review reports, UNCTAD-OECD reports on G20 Investment measures, and, finally, the United States Investment Climate Statements. The sources used regarding other measures in subchapter 4.1 were national legislation

as well as doing-business country reports published by different consultancy firms. In a similar manner, the sources consulted to identify measures of nationality or residency requirements for directors and managers were national corporate laws and doing-business reports published by consultancy firms. Finally, national legislation, news and consultancy reports, and feedback from stakeholders were used for other measures.

## 4.2.5 Chapter 5: Intellectual Property Rights

Chapter 5 deals with intellectual property rights (IPRs) measures in the digital economy.

Since digital sectors are a knowledge-intensive part of the economy, IPRs form a relatively important area in digital trade. Moreover, due to the great increase of trade in knowledge-intensive goods and services, and particularly high-technology goods, IPRs are now high on the agenda of international policy makers. IPRs can cover various legal expressions. In this chapter, we include patents, copyright, and trade secrets, which are considered essential for the digital economy.[20]

### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 5 is divided into three subchapters, each dealing with one form of IPR, namely patents, copyright, and trade secrets, as outlined in Table 4.9. This table also shows that these different forms are given similar relative importance as weights assigned for each subchapter are equal, namely 30 percent. Finally, a separate sub-category that contains additional restrictions important to the digital economy and which belong to this chapter has also been developed and receives a weight of 10 percent.

On a more general level, this chapter investigates not only the existence or availability of a relevant intellectual property law or regulation but also covers the actual enforcement of such a law or regulation on a complaint basis. The reason for performing analysis on a complaint basis relates to the fact that not all measures are always publicly known due to existing government structures. Table 4.9 also provides weights that have been assigned for all measures covered within each subchapter.

**Table 4.9**: Subchapters and Weights for Chapter 5

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **5.1** | **Patents** | | **0.3** |
| | 5.1.1 | Legal injunctions against digital goods | 0.4 |
| | 5.1.2 | Restriction on application process for patent | 0.5 |
| | 5.1.3 | Competition policy rules or other remedies used against patents | 0.1 |
| **5.2** | **Copyright** | | **0.3** |
| | 5.2.1 | Lack of clear copyright exceptions | 0.5 |
| | 5.2.2 | Inadequate enforcement of copyright | 0.5 |
| **5.3** | **Trade secrets** | | **0.3** |
| | 5.3.1 | Mandatory disclosure of business trade secrets | 1 |
| **5.4** | **Other restrictive practices related to IPR** | | **0.1** |
| | 5.4.1 | Other restrictive practices related to IPR | 1 |

[20] Other so-called neighbouring or related rights which are often associated with IPRs are not part of this chapter as they are not related to the category of knowledge goods or services, but merely serve the purpose of product differentiation through the creation of brands or provide consumers with information (Hoekman and Kostecki, 2012). Examples of these type of rights include trademarks and marks of original or geographical indicators.

## PATENTS

A patent provides holders with an exclusive right to exclude others from making, using or selling the patented invention for a temporary period of time. This subchapter takes up three specific measures related to the application process for patents and patents enforcement that act as a restriction for digital trade.

The first measure considered in this subchapter is legal injunctions on digital trade. When such measures are implemented, a domestic or foreign party is banned from selling a certain product in the country. While these measures are designed as a protection against patent infringement, they could be abused for political reasons. In addition, there are alternatives, such as fines for abuse of patents, which would be less-trade restrictive than imposing a ban to sell the product. A score of 1 is assigned when at least one of such measures is in place.

The second measure in this subchapter covers burdensome measures related to the application process for local patents or enforcement of foreign patents in a certain country. If such measures are in place, scores are given according to an interval range so as to account for their different levels of restrictiveness. In case there is any horizontal measure in place such as high registration costs, different terms of protection or if a country is not a member of the Patent Cooperation Treaty, a score of 0.5 is assigned. However, if a country has a specific measure that discriminates against foreign companies regarding patents, a score of 1 is applied. This highest score is only given when the measure has an impact on a digital product or sector as previously defined. A score of 0 applies when no measure is in place.

Finally, the third measure in this subchapter includes cases of competition policies and other remedies implemented against the use of patents. There is a close link between patent rights and competition policies. Normally, competition policy ensures that market entry is not unduly prevented beyond the boundaries set by the patent system. However, sometimes competition policy *per se* can constitute an instrument to weaken the patent system. If this is the case and competition policy or other remedies have been used in a country against the use of patents, a score of 1 is assigned. Otherwise, the score remains 0.

In terms of weighting, legal injunctions against digital goods as well as restrictions on application processes for patents receive the highest weights as these are considered to be the most burdensome restrictions in this subchapter.

## COPYRIGHT

Copyright is a legal right that grants the creators of an original work exclusive rights for its use and distribution. Copyright is important for firms in the digital economy. Copyright-based industries relevant to digital trade include software and data processing industries. Copyright is also applicable to certain forms of creative work which could fall under the digital economy sector, such as music and books. There are two measures taken up under this subchapter. One is whether a country lacks laws that provide clear copyright exceptions like fair use or fair dealing, which are considered necessary for the digital economy. The second one instead refers to whether there is an adequate enforcement of copyright online.

For the first measure of whether a clear regime of copyright exceptions is in place, a three-staged interval scoring is applied to account for possible alternatives. If a country does not provide a well-defined fair use or fair dealing doctrine, a score of 1 is given. The reason behind such a score is that the lack of clarity provides uncertainty and therefore limits the ability to provide digital products and services across borders. Going forward, when a country provides clear terms of the fair dealing doctrine or has an exhaustive and wide list of limitations and exceptions to copyright, or implements the three-step-test as stipulated in the Berne convention, a score of 0.8 is assigned. In other cases, when countries allow for the fair use doctrine a score of 0.2 is given, as the language is more flexible in this case. Finally, when countries allow for both fair use and fair dealing doctrines, they receive a score of 0.

The large jump of scoring from 0.2 to 0.8 is explained by the intrinsic differences between these two doctrines. Fair use is a fairly flexible concept. It is merely illustrative and provides a list of purpose or types of use and is, therefore, less stringent. Fair dealing allows for specific exceptions to copyright protection and is closer to the exhaustive list of exceptions, which is, consequently, seen as more rigid.

The second question in this subchapter deals with the issue of whether copyrights are adequately enforced online. If a government does not show any commitment to adequately enforce copyright online, which, for instance, would be the case when there are high rates of online piracy, a score of 1 is assigned and 0 otherwise.

The two subchapters receive equal weights reflecting equivalent importance.

### TRADE SECRETS

A trade secret is any type of valuable information, including a formula, pattern, compilation, program, device, method, technique or even process, which is undisclosed or not generally known or readily accessible but forms an essential economic value for the business model of a company. As such, trade secrets are particularly important for digital sectors as these sectors are knowledge-intensive and rely heavily on source codes and algorithms. The measures covered in this section look at whether the domestic legal system and the practices thereof require a mandatory disclosure of business trade secrets. When trade secrets are not acknowledged in the domestic legal system or when there is a case of mandatory disclosure of trade secrets, a score of 1 is recorded. When an adequate legal framework exists and no distortive measure is found, a score of 0 is given.

### OTHER MEASURES

We also include a separate subchapter that covers the additional measures a country applies regarding intellectual property law and/or enforcement issues, which are not directly covered in the other categories but nonetheless have a significant impact on a country's intellectual property environment. The assessment of these measures has been performed on a case-by-case basis and a score of 1 is assigned if there is any measure in place. Otherwise, the score remains 0.

### SOURCES

The main source used to assess measures regarding IPRs are reports from the World Intellectual Property Organization (WIPO), the OECD as well as reports from business and trade associations. National legislation was also consulted. To answer the question on the adequate enforcement of copyright online, in particular, we relied on complaints and reports from official established sources such as government agencies or national trade associations.

## 4.2.6 Chapter 6: Competition Policy

Chapter 6 considers competition policy, including those situations where the structure of the market, especially in the telecommunication sector, can create restrictions related to competition.

Anti-competitive practices in the domestic market affect the entry and efficiency of operations of both domestic and foreign companies. In other words, anti-competitive measures prevent competitive forces from being unleashed domestically. This, in turn, leads to higher prices for users of goods and services and in the long run results in lower productivity in the market economy. This is particularly true for the telecommunication sector, which forms an essential input for many other (downstream) sectors economy-wide.

The telecommunication sector lays down the general "infrastructure" for not only telecommunication services themselves, but also more broadly for other digital services using the network. The questions in this chapter are therefore formulated in a way that looks at how anti-competitive practices are detrimental not only to the telecommunication services, but also to other digital services. Friendly competition rules are critical for the digital economy to ensure that access and usage of the infrastructure is guaranteed.

### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 6 is divided into one main subchapter, plus a subchapter dealing with additional measures that do not fall under any of the main policy categories, as exhibited in Table 4.10. The main subchapter containing the most important measures related to competition policy is assigned a weight of 90 percent. Three measures are taken up in this subchapter and the table also shows the weights assigned to each of them to give relative importance across the three policy measures. The second subchapter is assigned a weight of 10 percent.

**Table 4.10**: Subchapters and Weights for Chapter 6

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **6.1** | **Competition** | | **0.9** |
| | 6.1.1 | Lack of liberalisation of the telecommunication sector | 0.5 |
| | 6.1.2 | Government ownership of shares of the incumbent telecommunications operator | 0.2 |
| | 6.1.3 | Anti-competitive practices in the telecommunication sector | 0.3 |
| **6.2** | **Other restrictive practices related to competition policy** | | **0.1** |
| | 6.2.1 | Other restrictive practices related to competition policy | 1 |

### COMPETITION

This subchapter takes stock of three specific measures which act as a distorting factor for competition in the telecommunication sector. First, this chapter assesses whether and to what extent deregulation has taken place in the telecommunication market and whether competition rules apply. Second, it verifies whether the government still owns any shares of the incumbent telecommunication operator. And finally, a third measure is taken up that investigates whether there are any other specific anti-competitive practices taking place regarding digital trade. These include measures such as high interconnection fees and restrictions related to access to the last mile.

In terms of scoring, regarding the first policy measure, an interval score is used that assesses the different degrees of deregulation reached in the telecommunication market. More specifically, if the telecommunications market is not properly deregulated or if no foreign ownership is allowed, a score of 1 is given. Going forward, two intermediate scores are assigned. The first intermediate score of 0.5 is applied to countries where the telecommunication market is deregulated, but access to a part of the network is still controlled by the incumbent telecommunication operator. The second intermediate score of 0.2 is assigned in cases where the telecommunication market has been deregulated, but the country in question is not a signatory of the WTO Reference Paper on Basic Telecommunications. Finally, a score of 0 is given for situations in which the telecommunications market is deregulated and where access to networks is in the hands of a separate legal entity which stands apart from the incumbent telecommunication operator.

The scoring for the second measure, which investigates cases in which the government still owns any shares of the incumbent telecommunication operator, is performed in a dichotomous manner. That is, if the incumbent operator has any share, even a minimum amount, that is still owned by the government, a score of 1 is assigned. On the contrary, if the incumbent telecommunication operator has been privatised and has no shares owned by the government, a score of 0 is assigned.

The last measure covers the existence of anti-competitive practices in the telecommunication market, which include *inter alia* refusal or high prices for interconnection and/or access to the last mile. Of note, the latter item of the last mile is a different measure than the access to the last mile as described above since here it concerns anti-competitive practices regarding the last mile whereas above it relates to the issue of ownership of the last mile. The scoring of this measure is also done in a dichotomous way. A score of 1 is given when there are no restrictions or complaints found of anti-competitive practices. A score of 0 is given when there are no complaints of these anti-competitive practices.

The weights allocated for each of these questions vary according to their level of impact. Greatest weight is given to the first measure of lack of liberalisation in the telecommunication that counts for 50 percent. The government share of incumbent telecom firms and other anti-competitive practices in the telecommunication market receive a weight of 20 and 30 percent respectively.

### OTHER MEASURES

A separate subchapter takes on any other measure that harms the competitive environment of the telecommunication sector and that discriminates against new (foreign) entrants. The existence of these and other additional discriminatory or restrictive measures against domestic and foreign services providers are assigned a score of 1. The analysis of this subchapter is done on a case-by-case basis.

### SOURCES

Sources used for this chapter are several and include comments from the private sector. Two important sources to perform the analysis of this chapter are the United States Section 1377 Review of Telecommunications Trade Agreements and reports from the International Telecommunications Users Group.

### 4.2.7 Chapter 7: Business Mobility

Chapter 7 looks into measures that form an obstacle to the mobility of natural persons to deliver a service on a temporary basis across borders in digital sectors.

In WTO speak, this chapter refers to the so-called Mode 4 of services supply which covers natural services suppliers such as independent professionals or professionals who work for a services company and are required to provide their services abroad. On a more general level, although Mode 4 trade is still relatively small as a share of total services trade (estimates indicate less than five percent based on Magdeleine and Maurer, 2008), this mode of supply is associated with high economic gains.

Overall, labour mobility can flow across borders in several forms, namely as part of a decision by a company to send an employee to work temporarily at a different office of the company abroad (i.e. intra-corporate transferee or ICT), as a contracted employee that is temporarily recruited by a company abroad (i.e. contractual services supplier or CSS), or as an individual who provides his or her services to another country independently on a temporary basis (i.e. independent service supplier or ISS).

Most measures restricting mobility regarding the three types of service suppliers are largely horizontal in nature, meaning that in most cases they apply to all sectors. Yet, this chapter also covers measures which are specific to digital sectors which are found in various countries. Telecommunications and computer services are the two most important sectors where sectoral restrictions in mobility have been looked at. In addition, restrictions in business mobility that specifically target "digital" or "ICT" sectors are also included.

#### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 7 is comprised of two subchapters. In the first subchapter, three specific measures are investigated with respect to the three types of formats through which labour mobility can take place, namely ICT, CSS, and ISS. These specific measures are (i) quotas, (ii) labour market tests, and (iii) limitations of stay of the foreign digital service supplier. The second subchapter identifies additional measures that fall within this category of labour mobility, but are not covered under any of the three types of restrictions in the first subchapter.

Table 4.11 shows that the first subchapter is given the most important weight of 90 percent as it contains the most stringent policy restrictions. The second subchapter is given a minimal weight of only 10 percent. Within the first subchapter, the table shows that each of the three measures is given equal weight.

**Table 4.11**: Subchapters and Weights for Chapter 7

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **7.1** | **Quotas, Labour market tests and Limits of stay** | | **0.9** |
| | 7.1.1 | Quotas | 0.33 |
| | 7.1.2 | Labour market tests | 0.33 |
| | 7.1.3 | Limits of stay | 0.33 |
| **7.2** | **Other restrictive practices related to business mobility** | | **0.1** |
| | 7.2.1 | Other restrictive practices related to business mobility | 1 |

## QUOTAS, LABOUR MARKET TESTS AND LIMITS OF STAY

Generally, it is difficult to judge whether a measure is more stringent with respect to one type of labour mobility over another. Overall, it is assessed that measures related to ICTs are more distorting for the digital economy compared to restrictions for either CSSs or ISSs. This has resulted in a scoring system in which any measure related to a quota or labour market test for intra-corporate transferees receives a score of 0.6. If a quota or labour market test measure also applies to an independent and contractual service supplier, it receives an additional score of 0.2 for each type. In the few cases in which a measure is only applied to either an independent or contractual service supplier, a score of 0.2 is given for each. Hence, the entire scoring for quotas as well as labour market tests can vary between 0 and 1 with intermediate steps of 0.2, 0.4, 0.6 or 0.8.[21]

The third measure of this subchapter is limits of stay, which apply when there is a fixed amount of time an ICT, CSS and ISS can stay in the country. In terms of scoring, a threshold of one year is applied to assess whether this measure forms a restriction or not. It means that any limit of stay above one year is not considered as a restrictive measure. If the limit of stay is lower than this threshold, then a score is assigned that follows a similar approach as above based on the three different types of labour mobility. Hence, if a limit of stay below and up to one year is applied to ICTs, this measure receives a score of 0.6. If a limit of stay up to one year is applied to an independent and contractual service supplier, it receives for each type an additional 0.2 score. In the few cases in which a measure is only applied to either an independent or contractual service supplier, a score of 0.2 is thus given for the one to which it applies.

The three measures in this subchapter are assigned an equal weight of 33.3 percent.

## OTHER MEASURES

The second subchapter takes stock of additional policy measures that fall outside the scope of the three measures mentioned above, but still have a restrictive character regarding business mobility. For instance, some countries require some form of wage parity so that salaries for certain professionals providing a (digital) service abroad must be higher than the minimum salary of that country. In some other cases, it is found that certain digital services providers need to employ domestic citizens. Each time an additional measure is found a score of 1 is given. Otherwise, a score of 0 is assigned.

## SOURCES

The main sources used to find information on the mobility of service suppliers are the OECD's Services Trade Restrictiveness Index database, the World Bank's Services Trade Restrictiveness database as well as national legislations, national labour codes and national immigration acts. In addition, the WTO and World Bank's I-TIP on applied regimes of services have been consulted as well as the Country Reports provided by the US Commercial Services. Apart from these reports, the Global Trade Alert (GTA) Database and the Market Access Database of the European Commission are also used.

[21] Note furthermore that regarding labour mobility, quotas are applied in two ways, namely directly as a nominal percentage such as in the case of Russia, or indirectly expressed as a percentage. This percentage quota can be based on various items. For instance, Ecuador has a 20 percent cap on foreign employees per firm. Another example is in Estonia where there is a regulation that holds that all foreign workers cannot exceed 0.1 percent of the permanent population annually. In all such and similar cases, these regulations are counted as a quota as well when explicitly formulated.

### 4.2.8 Chapter 8: Data Policies

Chapter 8 establishes a list of policy measures that are related to the movement and usage of data and which form an important cost for firms in the digital economy. The costs of policies restricting the flow of data across borders and its usage more generally can sum up to a significant impediment to the international economy as shown in some recent studies (van der Marel et al., 2016; ECIPE, 2014; 2013).

An increasing number of businesses from services to traditional manufacturing companies rely on the internet and the free flow of data across the globe throughout their production processes. Certain policies on data flows can be legitimate and necessary to protect the privacy of the individual or to ensure national security. However, when they result in excessively higher costs for using data and for moving data cross-border, they also become a restriction on digital trade.

The data policies taken up as part of this chapter cover all those measures which are relevant not only to the cross-border movement of data itself, but also to the provision of goods and services that are much dependent on the free flow of data across borders.

As such, this chapter contains (a) measures which are purely related to the cross-border transfer of data as well as (b) many associated domestic regulatory measures which indirectly affect the flow and usage of data such as administrative requirements related to data privacy and data retention. These latter policy measures can still affect the international flow of data because they have an impact on the incentive of the operators in any sector making use of data to invest and operate in certain countries.

#### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 8 includes five subchapters with an extra subchapter for additional measures. The five subchapters cover, respectively, (i) cross-border data flows, (ii) data retention, (iii) subject rights on data privacy, (iv) administrative requirements on data privacy and (v) excessive sanctions for non-compliance. As shown in Table 4.12, not all subchapters are affecting the free flow of data in an equally burdensome manner. Therefore, the weights have been set in such way so as to reflect each chapter's degree of restrictiveness in terms of costs for digital trade. The restrictions on cross-border data flow receive a higher weight of 50 percent as they are estimated to affect digital trade in a disproportionate manner.

The subchapters of data retention and administrative requirement on data privacy each receive a weight of 15 percent whereas the subchapter of subject rights on data privacy receives a weight of 10 percent. The chapters on sanctions as well as all additional measures receive a minor weight of 5 percent. Note that all these policies create an additional cost-burden for the firm by creating requirements that affect the usage of data, but do not have a specific cross-border dimension. Within each subchapter, the specific measures are also put into relative importance by applying additional weights.

**Table 4.12**: Subchapters and Weights for Chapter 8

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **8.1** | **Cross-border flow restrictions** | | **0.5** |
| | 8.1.1 | Ban to transfer or local processing requirement | 0.5 |
| | 8.1.2 | Local storage requirement | 0.25 |
| | 8.1.3 | Conditional flow regime | 0.25 |
| **8.2** | **Data retention** | | **0.15** |
| | 8.2.1 | Minimum period | 0.7 |
| | 8.2.2 | Maximum period | 0.3 |
| **8.3** | **Subject rights on data privacy** | | **0.1** |
| | 8.3.1 | Burdensome consent requirement | 0.5 |
| | 8.3.2 | Right to be forgotten | 0.5 |
| **8.4** | **Administrative requirements for data privacy** | | **0.15** |
| | 8.4.1 | Data protection impact assessment (DPIA) | 0.3 |
| | 8.4.2 | Data protection officer (DPO) | 0.3 |
| | 8.4.3 | Data breach notification | 0.1 |
| | 8.4.4 | Government access to personal data | 0.3 |
| **8.5** | **Sanctions for non-compliance** | | **0.05** |
| | 8.5.1 | Monetary fine above 250.000 euros or set as a percentage of revenue | 0.5 |
| | 8.5.2 | Jail time | 0.5 |
| **8.6** | **Other restrictive practices related to data policies** | | 0.05 |
| | 8.6.1 | Other restrictive practices related to data policies | 1 |

## RESTRICTIONS ON THE CROSS-BORDER FLOW OF DATA

The first subchapter covers measures restricting cross-border data flows. These measures are also referred to as "data localisation" measures, which are measures that either mandate data to be kept locally or impose conditions to transfer data cross-border.

Measures related to data localisation come in various forms and have different degrees of restrictiveness depending on the type of measure itself, but also on the sector and type of data affected. The most restrictive measures on the cross-border flow of data are bans to transfer data across the border and local processing requirements. In case of a ban to transfer data or a local processing requirement, the company needs to either build data centers within the implementing jurisdiction or switch to local service providers with a consequent increase in costs if these domestic service providers are less efficient than foreign providers. The difference between bans to transfer and local processing requirements is quite subtle. In the first case, the company is not allowed to even send a copy of the data cross-border. In the second case, the company can still send a copy of the data abroad which can be important for communication between a subsidiary and its parent company, and in general for the exchange of information within the company. In both cases, however, the main data processing activities need to be done in the country.

For the scoring of these measures, both the sectoral coverage of the measure as well as the type of data affected are taken into account. If the ban to transfer or local processing requirement applies to a specific subset of data (for instance, when it applies to health records or accounting data only), this measure receives a scoring of 0.5. A similar score is also assigned when the restriction only applies to specific countries (for instance, when data cannot be sent for processing only to a specific country). On the other

hand, when the measure applies to all personal data or data of an entire sector (such as financial services or telecommunication sector), then a score of 1 is given. Measures targeting personal data also received the highest score because it is often hard to disentangle personal information versus non-personal information (MIT, 2015), and therefore measures targeting personal data often end up covering the vast majority of data in the economy.

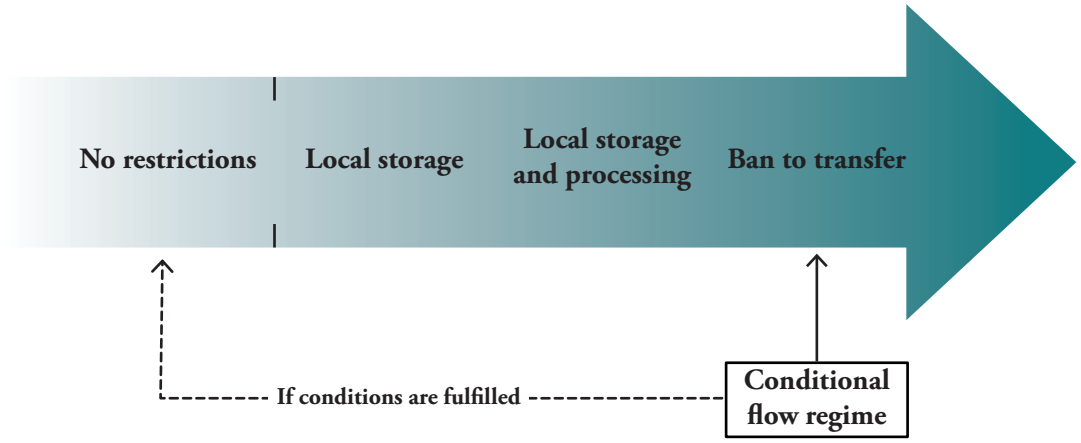
The second category of measures cover local storage requirements. These measures require a company to keep a copy of certain data within the country. Local storage requirements often apply to specific sets of data, such as accounting data. As long as the copy of the data remains within the national territory, the company can operate as usual. As for the scoring, when data storage is only for specific data as defined above, this measure receives a score of 0.5, whereas when the data storage applies to more than one set of data, to personal data, or to an entire sector, it receives a score of 1.

The third category of cost-enhancing measures related to the cross-border flow of data is the case of conditional flow regime. These measures forbid the transfer of the data abroad unless certain conditions are fulfilled. If the conditions are stringent, the measure can easily result in a ban to transfer. The conditions can apply either to the recipient country (e.g. some jurisdictions require that data can be transferred only to countries with an "adequate" level of protection) or to the company (e.g. a condition might consist of the need to request the consent of the data subject for the transfer cross-border of his/her data). In terms of scoring, if a conditional flow regime is found, it receives a score of 0.5 if it applies to specific data, but it receives a score of 1 where conditions apply for personal data and/or the entire sector.

Of note, in certain cases, it is not easy to discern whether a measure is a ban to transfer, a local processing requirement or a conditional flow regime. In fact, often cases of a ban to transfer and local processing requirements have certain exceptions which might *de facto* result in a conditional flow regime.

Figure 4.1 shows a graphical representation of the various levels of data localisation measures taken up in this subchapter. The direction of the arrow indicates the increased level of restrictiveness. Note that conditional flow regime is put outside this conventional sequence of restrictiveness because it prevents the flow of data only when the conditions are not fulfilled. Also, note that in Table 4.12 the ban to transfer is put together with local processing requirements although these two measures have actually been separated in Figure 4.1. The point is that the impact of those measures on trade is very similar and they are not always easy to discern. Yet, a ban to transfer is generally more restrictive than a local processing requirement.

**Figure 4.1**: Graphical Overview of Data Policies




Source: Ferracane (2017).

In accordance with this order of restrictiveness, weights within this subchapter have been allocated to each of the measures. Highest importance is given to bans to transfer and local processing requirements which receive a weight of 50 percent, while conditional flow regimes receive a weight of 25 percent since these measures can result in a ban to transfer if conditions are stringent. Measures related to local storage are not as restrictive as local processing requirements and therefore receive a lower weight of 25 percent under this subchapter.

### DATA RETENTION

The second subchapter deals with measures related to data retention, which are measures regulating how and for how long a company should keep certain data within its premises. Data retention measures can define a minimum period of retention or a maximum period of retention. In the first case, the companies (often telecommunication companies) are required to retain a set of data about users' activity for a certain period, which can go up to two years or more in extreme cases. These measures can be quite costly for the companies and they are assigned a weight of 70 percent. On the other hand, the measures imposing a maximum period of retention are somewhat less restrictive and prescribe the company not to retain certain data when it is not needed anymore for providing their services. They are therefore given a weight of 30 percent. In both cases, the measures have a dichotomous numerical score. The country receives a score of 1 when there is a measure, while 0 is assigned in case of absence of these measures.

### SUBJECT RIGHTS ON DATA PRIVACY

The third subchapter includes measures related to subject rights on data privacy. The rights of the data subject are often a legitimate goal in itself, but certain requirements can nonetheless represent a cost for the firm when they are implemented disproportionally or in a discriminatory manner. This is the reason why they are covered in the database. However, they only form a smaller part of the entire chapter with a weight of 10 percent as their cost on business is significantly low compared with other measures. Two categories of measures are identified regarding data subject rights, which are (i) strict consent for the collection and use of data (with a weight of 50 percent within the subchapter) and (ii) the right to be forgotten (also with a weight of 50 percent).

In all cases, the scoring is applied in a dichotomous manner. If one of the measures applies, a score of 1 is given whereas a score of 0 is assigned otherwise. Regarding the first measure on the request of consent for the collection and use of data, a score of 1 is given only when the process for requesting consent is considered as disproportionately burdensome. This is the case when the consent has to always be written and explicit, or when consent is required not only for the collection of data but also for any transfer of data outside the collecting company. If this is not the case, then a score of 0 is assigned. Additionally, important to note is that, if the consent is required only in case of transfer across borders, this measure is instead reported in the first subchapter under conditional flow regime and scored accordingly.

### ADMINISTRATIVE REQUIREMENTS FOR DATA PRIVACY

The fourth subchapter covers administrative requirements on data privacy. Measures included in this subchapter are (i) the requirement to perform a data privacy impact assessment (DPIA) (with a weight of 30 percent), (ii) the requirement to appoint a data protection officer (DPO) (also with a weight of 30 percent), (iii), the requirement to notify the data protection authority in case of a data breach (with a weight of 10 percent), and finally (iv) the requirement to allow the government to access the personal data that is collected (also with a weight of 30 percent).

For the scoring, the first two measures receive a score of 1 when a measure applies and 0 otherwise. When it comes to the notification of a data breach, this measure is scored only in cases in which the notification applies for any data breach and not only those instances which are worrisome. In the case of the fourth

measure, which is the requirement to allow a government to access collected personal data, a full score of 1 is assigned only when the government has an open access to data in at least one sector of the economy. If a government only has access to escrow or encryption keys,[22] but still notifies access to the data, an intermediate score of 0.7 is assigned. Government direct access to data handled by the company or the use of escrow keys may, in fact, create remarkable consumer dissatisfaction that can lead to the user's termination of service demand. Finally, if the government has to follow the same procedure that it would follow for offline access to data - that is, the presence of a court decision or a warrant, or when the request follows a judicial investigation process - then a score is 0 applied.

### SANCTIONS FOR NON-COMPLIANCE

The fifth subchapter examines measures which impose a sanction for non-compliance. These measures cover both pecuniary and penal sanctions with a weight of 50 percent for each of them. The pecuniary sanctions are not considered a restriction *per se*, but their presence is listed in the database and accounted for in the index when (i) they are above 250.000 EUR; (ii) companies have explicitly complained about disproportionally high fines or discriminatory enforcement of sanctions; (iii) they are expressed as a percentage of a company's domestic or global turnover.

In fact, in all these cases, the sanctions have the capacity of putting a company out of business and might play an important role in the economic calculation of a company. Under this section, we also list those instances in which the infringement of data privacy rules can be sanctioned by closing down the business. The imposition of penal sanctions as a result of infringement of data privacy rules is also included in the database as an additional restriction under this subchapter. Instances in which penal sanctions are assigned as a result of identity theft and similar illegal actions are obviously not included. For what concerns the scoring, if these cases are identified, a score of 1 is assigned and 0 otherwise.

### OTHER MEASURES

Finally, the last subchapter takes up all those measures which are related to data policies but do not fit under any of the aforementioned subchapters. These include, for example, certain additional regulations related to cloud computing. All these measures are assigned with a score of 1 when applied.

### SOURCES

The main sources used in this chapter are national data protection legislation. Otherwise, information is obtained from legal analyses on data policies and regulations from high profile law firms and from Stone et al. (2015). Occasionally corporate blogs and business reports were also taken into consideration.

[22] Key escrow is an arrangement in which the keys needed to decrypt encrypted data are held in escrow so that, under certain circumstances, an authorised third party may gain access to those keys.

## 4.2.9 Chapter 9: Intermediate Liability

Chapter 9 looks into policy measures that cover the issue of intermediary liability and safe harbour for intermediaries.

Various players are active on the internet and it is important to distinguish their roles in the digital field. On the one hand, there are content producers which are individuals or organisations that are responsible for producing information on the internet and posting it online. On the other hand, there are intermediaries which are companies that act as a mediator between content producers and the internet. Such companies include Internet Service Providers (ISPs), web hosting providers, social media platforms and search engines.

In some jurisdictions, intermediaries bear the legal responsibily for the illegal and harmful activities performed by their users even when the platforms are unaware of these activities, so-called "intermediary liability". They have an obligation to prevent the occurrence of unlawful or harmful activity by users of their services and, in case of failure to comply with such obligation, they might be exposed to civil or criminal legal action. In these cases, intermediaries do not have the sufficient legal certainty to conduct their activities and they operate under the threat of potential liability and the chilling effect of potential litigation.

Other countries apply the so-called safe harbour model, which means that they grant internet intermediates broad or conditional immunity for third-party content, provided that certain conditions are respected. The conditions of safe harbours vary considerably across countries: in some jurisdictions, intermediaries need to comply with certain filtering requirements to be made exempt from liability; in others, they need to take down content once they have received a complaint (referred to as 'notice-and-takedown' regime); and in others, they need to take action only once a court has confirmed the validity of a claim (Oxera, 2015). In all cases, however, the legal framework in these countries does not require intermediaries to monitor online content. The existence of a safe harbour is considered a strategic factor supporting the emergence of innovative services.

### SUBCHAPTERS, WEIGHTS AND SCORING

This chapter covers two main subchapters, plus a subchapter which includes additional measures. The main subchapters are (i) regulations related to the framework to provide safe harbour and (ii) notice and takedown regime. Table 4.13 shows the weights applied to each of these subchapters in the overall chapter index. Measures related to the safe harbour principle count most with a weight of 60 percent whereas the subchapter on notice and takedown regime is given a weight of 30 percent. The subchapter covering the additional measures that were found counts for a minor 10 percent. Within each subchapter, the specific measures are also put into relative importance by using weights as Table 4.13 shows.

**Table 4.13**: Subchapters and Weights for Chapter 9

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **9.1** | **Framework providing a safe harbour** | | **0.6** |
| | 9.1.1 | Lack of safe harbour for intermediary liability | 0.7 |
| | 9.1.2 | User identity requirements | 0.1 |
| | 9.1.3 | Monitoring requirements | 0.2 |
| **9.2** | **Notice and takedown regime** | | **0.3** |
| | 9.2.1 | Burdensome terms for notice and takedown | 0.7 |
| | 9.2.2 | Financial sanctions for non-compliance with notice | 0.3 |
| **9.3** | **Other restrictive practices related to intermediary liability** | | **0.1** |
| | 9.3.1 | Other restrictive practices related to intermediary liability | 1 |

## FRAMEWORK PROVIDING A SAFE HARBOUR

As part of the first subchapter, three essential measures are taken up, which are (i) whether there is a framework that provides a safe harbour for intermediaries, (ii) whether there are any user identity requirements, and (iii) whether there are any monitoring requirements that apply for the intermediary.

Regarding the first measure in the first subchapter, as mentioned above, the presence of a safe harbour regime is crucial for intermediaries to shield them from liability for third-party activities, which covers both alleged copyright infringement and other illegal activities. In fact, the threat of liability inhibits the willingness of intermediaries to host user-generated content and therefore to operate and could furthermore obstruct innovation activities in this area. Generally, there are different degrees in which these safe harbour frameworks relieve intermediaries from liabilities and these are taken into account in the scoring for the index. A country receives a scoring of 1 if there is no safe harbour regime in place. An intermediate score is given when countries do have a safe harbour in place, but with a limited scope. That is if the framework only covers copyright and no other illegal activities. In such case, a score of 0.5 is assigned. On the other hand, when the local law provides broad and clear exceptions of liability for intermediates, a score of 0 is given, implying there is no restriction in place.

The second and third measures in this subchapter are connected to the fact that, in recent years, there has been increasing pressure on intermediaries to act as "gatekeepers" of the internet. Many countries have adopted legal rules that have effectively forced internet intermediaries to police aspects of the internet on behalf of the government. Such measures relate to the identification and monitoring of internet users. If there is an identification requirement, the intermediary has to ensure that their users supply accurate personal information. Similarly, monitoring requirements include those cases in which the intermediary is obliged to monitor the users' activities and remove or block content deemed illegal or harmful. This requires a substantial effort for the intermediary to monitor anything that is posted, shared or transferred through the platform. Any known case of the requirement for identification and monitoring receives a score of 1, and 0 otherwise.

The three measures are given a weight so as to assess their relative importance. Lack of safe harbour for intermediary liability is assigned the highest weight of 70 percent as this is most burdensome. Compared to the safe harbour measure, these latter two measures of identifying and monitoring receive a lower weight of 10 and 20 percent respectively.

## NOTICE AND TAKEDOWN REGIME

The second subchapter covers the notice and takedown regime. When a safe harbour is in place, the intermediary has a certain procedure to follow in order to be shielded from liability. Usually, the intermediary receives a notice and has a certain period of time to take down the infringing content. This is the notice and takedown regime. Yet, there are some cases in which such a regime is particularly strict and makes it especially burdensome for the intermediary to comply with. If, for example, the time for a takedown after receiving a notice is very short, the intermediary might not be able to cope with the request and would find itself liable. In terms of scoring, if any of such cases are found in a country, it receives a score of 1 whilst a score of 0 is assigned if there is no such case.

This subchapter also lists those cases in which there are substantial financial sanctions for non-compliance. Countries that have these financial sanctions in place receive a score when (i) the financial sanctions are expressed as a percentage of a company's domestic or global turnover; and (ii) when there has been a complaint which reports that the sanctions applied are disproportionate. In terms of scoring, a score of 1 is applied if this is the case, and 0 otherwise.

## SOURCES

The main source used for this chapter is the World Intermediary Liability Map (WILMap), which is a Stanford University Law Online Database about evolving internet regulations. However, other sources are also used and include reports from the OECD, the European Commission and other businesses and organisations.

## 4.2.10 Chapter 10: Content Access

Chapter 10 takes stock of the policy measures related to content access online.

The internet has created new channels for companies to reach their potential customers and for users to make informed purchases and enjoy new services. However, some countries restrict the access to content for consumers. In some instances, there are internationally agreed exceptions for blocking access to a certain type of content or information such as illegal content and child pornography, which are not taken up in our database.

The measures covered in this chapter refer to restrictions on content that is provided on a commercial basis. These restrictions come in various means ranging from blocking and filtering activities by governments to bandwidth restrictions. The latter include the issue of net neutrality which is the principle that Internet Service Providers (ISPs) should enable access to all content and applications regardless of the source, and without favouring or blocking particular products or websites. All these measures increase the cost of offering services online or in some cases even make it impossible. These restrictions, therefore, limit the opportunities for consumers to access these services.

### SUBCHAPTERS, WEIGHTS AND SCORING

This chapter has two main subchapters and another that covers additional restrictive measures. The two main subchapters contain measures related to (i) censorship and filtering and (ii) bandwidth and net neutrality. The third is comprised of other measures important to content access, but which are not classified under the first two subchapters.

**Table 4.14**: Subchapters and Weights for Chapter 10

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **10.1** | **Censorship and filtering of web content** | | **0.7** |
| | 10.1.1 | Blocking of web content | 0.5 |
| | 10.1.2 | Filtering of web content | 0.25 |
| | 10.1.3 | Discriminatory use of license schemes | 0.25 |
| **10.2** | **Bandwidth and net neutrality** | | **0.2** |
| | 10.2.1 | Deliberate slowdown of foreign websites | 0.5 |
| | 10.2.2 | Network bandwidth priority to certain content | 0.1 |
| | 10.2.3 | Restrictive cloud computing regulations | 0.2 |
| | 10.2.4 | Specific regulations for social networks | 0.2 |
| **10.3** | **Other restrictive practices related to content access** | | **0.1** |
| | 10.3.1 | Other restrictive practices related to content access | 1 |

Table 4.14 shows that the first subchapter receives the highest weight as part of the overall chapter index as it counts for 70 percent, compared to the second subchapter of bandwidth and net neutrality issues, which counts for 20 percent. The subchapter of additional measures makes up for a minor share and receives a weight of 10 percent. Within each subchapter, the specific measures are also put into relative importance by using additional weights.

## CENSORSHIP AND FILTERING

This subchapter is split into three sections, each covering a policy measure. These are (i) blocking of online content, (ii) filtering of online content, and (iii) the discriminatory use of licensing schemes for ISPs and applications.

The first type of measure, which refers to the blocking of online content, covers those cases in which certain commercial content is blocked by the government. Various methods are used to block content online. Government actors can block or tamper with domain names, block a particular IP address, or urge online content providers to remove content or search results. There are different reasons for which governments want to block online content, often based on national cultural norms or political considerations.

The DTE database only includes those cases in which the blocking entails a restriction of a commercial activity, and therefore blocking of non-commercial content is not included. For scoring this measure, an interval scoring is applied. If there is a government mandated technical blocking on grounds of copyright or online gambling, then a score is 0.7 is applied. In addition, if there is any other blocking of content hampering a commercial activity a score of 1 is applied. If no blocking takes place, a score of 0 is assigned.

The second measure relates to the filtering of non-political, non-religious web content by a government or its operators. If there are cases in which there is a government-mandated activity of filtering, a score of 1 is given to a country. In cases where no filtering activities take place, a score of 0 is assigned.

The third measure as part of this subchapter looks at the discriminatory use of license schemes for ISPs and applications. If there is at least one case of online-only licensing schemes, which is therefore not required offline, a score of 1 is applied. If there is no evidence that there are discriminatory licensing schemes, a score of 0 is given.

Regarding the weights within this subchapter, the blocking of online content is given greater importance compared to filtering and discriminatory licensing schemes and counts for 50 percent with the other two items sharing equal weights of 25 percent.

## BANDWIDTH AND NET NEUTRALITY

Four restrictive measures are taken up in this subchapter examining different elements of content access related to internet bandwidth and net neutrality. The first measure looks at whether there have been any reports of a deliberate slowdown of foreign websites. If that is the case, and there has been at least one proven case of foreign website slowdown in the country, a score of 1 is given, whilst a score of 0 is applied if there is no reported case of such measures. Similarly, the second measure takes stock of whether there have been any reports of practices of network bandwidth priority of content and applications, which means that there is discriminatory access to the network given across different providers. If there is such a known case whereby there are official complaints of such practices, a score of 1 is assigned. If there are no known cases of this measure, a score of 0 is applied.

The third and fourth measures of this subchapter look at whether there are specific regulations that are known to be burdensome regarding cloud computing and social networks. We do not include all regulations in these areas, but only those cases considered especially burdensome or when there have been any specific formal complaints on these regulations. As such, these measures obtain a score of 1 if there is a specific measure or if there are complaints registered, whilst a score of 0 otherwise.

In terms of weights, cases of deliberate slow-down of foreign websites are given highest importance with a weight of 50 percent under this subchapter, as this measure is considered the most burdensome. Restrictive measures on network bandwidth are given a weight of 10 percent whilst the latter two measures of cloud computing and social network regulations are each given a weight of 20 percent.

## OTHER MEASURES

The last subchapter identifies additional restrictive measures which relate to content access, but do not belong to the other categories analysed. Any measure found which is considered as burdensome receives a score of 1. If no additional restrictions are in place, a score of 0 is applied.

## SOURCES

For blocking and filtering measures, the main sources are the latest available reports of Open Net and Freedom House. For measures related to the discriminatory use of license schemes, information was found in complaints reported by the industry formally identified as credible sources and the United States Section 1377 Review of Telecommunications Trade Agreement. The principal sources for regulations regarding cloud computing and social media are provided by industry experts and OECD papers including Koske et al. (2014).

## 4.2.11 Chapter 11: Quantitative Trade Restrictions

Chapter 11 covers various quantitative trade measures as well as measures which can have an equivalent restrictive impact on the tradability of digital goods and services.

This chapter covers quantitative import and export restrictions. Import restrictions include quantitative restrictions that prevent a country from importing a good (or, more rarely, services) in terms of volume. They come in various forms such as import bans or import quotas. In addition, import restrictions also cover other quantitative measures that have a similar effect on the volume of a good (or service) that can be imported such as overly restrictive or non-transparent import licensing schemes.

Additionally, this chapter also covers export restrictions which restrict the volume of goods that a country can export. Export restrictions can be applied, for example, to protect valuable extractive resources in order to maintain the supply for domestic industries or with the purpose of creating artificial scarcity in the world market so that relative price changes occur.

This chapter also includes local content requirements for the commercial market. These measures usually require the suppliers of a good (or service) to source a certain percentage of intermediate goods (or services) from domestic producers. For foreign producers, it is therefore usually more difficult to find suitable domestic suppliers and integrate them in their supply chains than for domestic producers who are more familiar with domestic supplier networks and are closer to the domestic supply chain. The degree to which local content requirements have an impact on trade depends on the percentage of the local content that is required and on how efficiently local suppliers are able to provide the intermediate input.[23]

Note that this chapter only deals with local content requirements which are applied to products on commercial markets and therefore excludes local content requirements regarding government procurement schemes, which are covered in Chapter 3.

### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 11 has three subchapters as shown in Table 4.15. The first subchapter contains measures on import restrictions and covers complete import bans as well as other less restrictive measures applied at the border. The second subchapter covers local content requirements for commercial markets, while the third subchapter contains export restrictions for digital goods.

**Table 4.15**: Subchapters and Weights for Chapter 11

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **11.1** | **Import restrictions applied to digital goods** | | **0.6** |
| | 11.1.1 | Import ban | 0.6 |
| | 11.1.2 | Other import restrictions | 0.4 |
| **11.2** | **Local content requirements for commercial market** | | **0.3** |
| | 11.2.1 | Local content requirements | 1 |
| **11.3** | **Export restrictions on digital goods** | | **0.1** |
| | 11.3.1 | Export restriction | 1 |

[23] Stephenson (2013).

Since import restrictions affect trade most directly and significantly, the first chapter receives the highest weight of 60 percent as part of the overall chapter index. In addition, between local content requirements for commercial markets and export restrictions, the former is considered more burdensome and therefore receives a higher weight compared to export restrictions, i.e. 30 versus 10 percent for the respective chapters. Moreover, export restrictions are a relatively rare phenomenon and they only affect other countries' interest if the restricted good is scarce on the global market. Within each subchapter, the specific measures are also put into relative importance by using additional weights.

## IMPORT RESTRICTIONS

The database includes import restrictions if these measures target digital goods and/or services either directly or as part of a horizontal measure such as lack of transparency of a licensing system. As such, all other import restrictions that do not have any relationship with the digital economy are excluded.

This subchapter is divided into two categories of measures, namely (i) import bans and (ii) measures categorised as "other" import restrictions. Import bans are the most restrictive measures and inhibit imports completely. In terms of scoring, any measure in this category receives a score of 1. Alternatively, the score remains 0.

Measures labeled as "other import restrictions" include quotas, which limit but do not completely inhibit imports, as well as other restrictive measures such as overly restrictive or non-transparent import licensing schemes. For the scoring of these measures, if at least one restrictive measure is in place or there are complaints that the measure is considerably restrictive, a score of 1 is assigned. A similar score of 1 is also given when there are two or more trade restrictive measures that are thought to be somewhat less trade distortive. If there is at least one measure or complaint on more general issues regarding import procedures (such as a lack of transparency or discriminatory procedures), a score of 0.5 is applied. In case no measure exists in a country, a score of 0 is assigned.

Since import bans are more restrictive in nature, this category receives a weight of 60 percent whilst the second category of less restrictive trade measures is given a weight of 40 percent.

## LOCAL CONTENT REQUIREMENTS FOR COMMERCIAL MARKET

In a similar manner as in the first subchapter, local content requirements for commercial markets have been included in the database only if they explicitly target digital goods or sectors, or if they are completely horizontal.

The methodology for the scoring is the same as applied for local content requirements in public procurement, which are covered in Chapter 3. The measures are scored according to the scope of products or services that are affected.

The scoring for this measure reflects the scope of products and services covered. If a local content requirement is horizontal, sectoral or affects a broad range of product group (i.e. roughly equivalent to HS 2 and 4-digit levels such as electrical machinery or telephony equipment), a value of 1 is given. If a local content requirement is at the product level (i.e. roughly equivalent to the HS 6-digit level), a value of 0.5 is given. If no local content requirement is found, a score of 0 is applied. Moreover, a score of 1 is also given when at least two measures of a more limited scope of application are applied. These measures can create a serious burden for the foreign companies and this sub-chapter therefore receives a weight of 30 percent.

## EXPORT RESTRICTIONS

For the purpose of this database only selected export restrictions are included. Export restrictions on dual-use items are included if they cover specific digital goods, such as information security equipment for other "civilian" digital economy products. Moreover, measures such as trade bans stipulating horizontal export restrictions which apply across all sectors regarding a specific country have also been included. In contrast, general export restrictions on dual-use items related to nuclear and weapons technology and export restrictions resulting from internationally agreed sanctions were not included. For the scoring, a country receives a score of 1 if any such measure is found and 0 otherwise.

## SOURCES

The main sources used in this chapter are the Global Trade Alert (GTA) database and the Market Access Database of the European Commission. Furthermore, reports on foreign trade barriers issued by the Office of the United States Trade Representative (USTR) as well as the 11th Report on Potentially Trade-restrictive Measures issued by the European Commission in 2014 were used. For import restrictions, the WTO's Database on Quantitative Restrictions and the WTO's Notification on Import Licensing were also employed. For local content requirements, the WTO's Trade Policy Review Reports issued by the WTO Secretariat as well as the Country Reports provided by the US Commercial Services were taken as a source.

### 4.2.12 Chapter 12: Technical Standards

Chapter 12 looks into standards that can act as a trade restriction for goods and services in the digital economy.

The use of ICT and the spread of digital technologies across sectors and borders through the increased use of the global internet have created a greater need for interoperability among products and services. On a more general level, standards are rules that set out the minimum requirement necessary to ensure that an item, good or services activity is doing what it intends to do. If properly developed, common standards between sectors and countries play a positive role in promoting the efficient spread of new technologies and help to eliminate the heterogeneity of operational practices that act as a restriction to trade among countries.

Although there are internationally agreed procedures for standards on digital products, not all national standards are based on such worldwide common basis. This could create inefficiencies in the market, which result in higher trade costs. In fact, governments may use national regulations and standards as a less transparent means of restricting the entry of foreign products and services. When they differ from international norms, these standards, therefore, create additional costs for businesses - without necessarily contributing to increased quality, security or safety. Similarly, standards or standard-related measures can also be outdated, overly burdensome, discriminatory, or just inappropriate, and for these reasons also create an unnecessary technical obstacle to trade.

**Table 4.16**: Subchapters and Weights for Chapter 12

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **12.1** | **Telecom standards** | | **0.2** |
| | 12.1.1 | Lack of foreign business participation in standard-setting bodies | 0.5 |
| | 12.1.2 | Non-transparent standards regime | 0.5 |
| **12.2** | **Product safety certification (EMC/EMI, radio transmission)** | | **0.2** |
| | 12.2.1 | Lack of self-certification | 0.5 |
| | 12.2.2 | Discriminatory application process for foreign businesses | 0.5 |
| **12.3** | **Product screening and testing requirements** | | **0.3** |
| | 12.3.1 | Product screening and testing requirements deviating from international norm | 0.5 |
| | 12.3.2 | Ban of digital goods or services on the grounds of national security | 0.5 |
| **12.4** | **Encryption requirements** | | **0.2** |
| | 12.4.1 | Mandatory encryption standards deviating from international norm | 0.33 |
| | 12.4.2 | Lack of recognition of international encryption standards | 0.33 |
| | 12.4.3 | Required disclosure of sensitive proprietary information for product certification | 0.33 |
| **12.5** | **Other restrictive practices related to standards** | | **0.1** |
| | 12.5.1 | Other restrictive practices related to standards | 1 |

## SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 12 has four main subchapters plus a subchapter that contains additional measures related to standards which do not fit under any of the four main subchapters. The main subchapters cover the following categories: (i) telecom standards, (ii) product safety certification, (iii) product screening and testing requirements, and (iv) encryption requirements.

Table 4.16 exhibits the weights given to each of the subchapters and shows that they are almost equally distributed across each other as part of the overall chapter index. The only subchapter which has a somewhat higher weight is the subchapter on product screening and testing requirements. The reason is that these requirements might be particularly burdensome for companies and could be implemented in a non-transparent manner. The fifth subchapter dealing with additional measures has a lower weight of 10 percent in the overall chapter index. Within each subchapter, the specific measures are also put into relative importance by using weights.

## TELECOM STANDARDS

This first subchapter of telecom standards looks at practices within the standard setting procedures that discriminate against foreign businesses. As such, the discriminatory element should take place in the process of developing broadband, mobile, and ICT product standards.

Generally, standards can be set by formal government standard-setting bodies and this process should also involve foreign industry representatives. Moreover, comments from stakeholders should be taken into account to develop open, transparent and non-discriminatory standards. When this is not the case and foreign business and actors are not allowed to participate in local standard-setting bodies, then this is considered a restriction and it is therefore included in the database. In terms of scoring, any case found in a country where foreign businesses are not allowed to participate in terms of discussing and negotiating draft standards, a score of 1 is given. Otherwise, the score remains 0.

The second type of measures which belong to this subchapter are situations in which standard requirements are considered non-transparent. This can be because in some countries standard-setting procedures are very fragmented between federal standards, local standards and industry standards that apply simultaneously. This fragmentation also appears when there is a national standard applied in addition to an internationally agreed practice. In terms of scoring, if a complaint is registered about standards or if standard requirements are non-transparent, the country receives a score of 1, and 0 otherwise.

The two measures are assigned equal relevance, which means that similar weights of 50 percent are applied to each of them.

## PRODUCT SAFETY CERTIFICATION

The second subchapter of standards relates to compliance procedures and filing requirements for product safety certification. Product certification is the process of certifying that a product has passed certain performance and quality assurance tests. While standards are necessary, they impose additional costs on exporters when they diverge between countries. In the case of digital goods and products, when internationally-harmonised standards and practices are available, the existence of additional national certifications and standards results in higher costs for exporters which can distort trade. Whether for radio transmission, electromagnetic interference (EMI) or electromagnetic compatibility (EMC), product safety certification usually follows a similar procedure internationally. However, there are countries that require additional procedures or certifications which deviate from the international norm.

The first type of measures included in this subchapter are situations in which self-certification is not allowed for foreign businesses. Most electrical products have to comply with certain standards, for instance in relation to electromagnetic interference. When this is the case, usually countries allow the exporters to self-certify that they comply with these standards. Yet, not all countries allow exporters to self-certify compliance and require additional testing in the country. These instances are considered to be a restriction and are assessed with an interval score.

If the legal framework allows for self-certification such as a Supplier Declaration of Conformity (SDoC), a score of 0 is assigned. On the other extreme, a score of 1 is assigned if a SDoC is not permitted or if it is only allowed for domestic producers, and mandatory testing in a local laboratory is required for accreditation. An intermediate score of 0.5 is given when, although a SDoC is not permitted, third-party certification from Conformity Assessment Bodies (CABs) in other countries are accepted. This is usually the case when the country has signed a Mutual Recognition Agreement (MRA) with another country. In such cases, members of an MRA agree to recognise each other's test reports and certificates, which reduces the burden for companies so that they do not need to go through the entire certification procedure.

The second measure taken up in this subchapter investigates whether there are situations where a formal complaint related to the processing of applications for product safety certification has been registered. If this is the case, only those cases are reported in which the process of application has been discriminating against foreign businesses or more generally in which foreign applications are slowed down. If any of such formal complaints are registered, a score of 1 is assigned while a score of 0 is given if there is no such known case.

In terms of weights between the two measures in this subchapter, both receive an equal weight of 50 percent.

### PRODUCT SCREENING AND TESTING REQUIREMENTS

The third subchapter deals with product screening and testing requirements. It covers those instances in which countries impose additional screening and testing which deviate from the international norm, as well as cases in which there are bans on imports of certain products based on national security. The first type of measure analyses whether there are product screenings and/or testing requirements in place for ICT products and network equipment that deviate from the international norm. As in the previous subchapter, this measure is assessed with an interval score. If there is a product screening or testing requirement, but third-party testing results are accepted by local authorities, a score of 0.5 is given. If third-party testing results are not accepted, then a score of 1 is assigned. If instead, no additional product testing and screening take place, a score of 0 is assigned.

The second measure taken up in this subchapter identifies whether there are foreign digital products which are banned from commercial markets on the grounds of national security. These digital products could be, among others, network equipment, services, handsets, or services such as data processing and e-mail provision. Bans on the grounds of national security which apply only to government agencies are instead listed in the public procurement chapter. If this is the case, a score of 1 is assigned. Alternatively, the score of 0 is applied if this is not the case.

Both types of measures in this subchapter share equal weights of 50 percent.

### ENCRYPTION REQUIREMENTS

The fourth subchapter analyses whether there are standards related to encryption that are regarded as restrictive for digital trade. Encryption is used in the process of encoding messages or information in such a way that only authorised parties are able to read it.

In this subchapter, three types of measures are verified. First, whether there are mandatory encryption standards that deviate from international standards. If there is any measure or a complaint registered from a source, it will receive a score of 1. Second, it is also verified whether international encryption standards testing and certification requirements are recognised. Again, if there is any measure or complaint registered from a source, this receives a score of 1. Third, this subchapter also investigates whether there is disclosure of sensitively proprietary information needed in the encryption product certification processes. Here too, if this is the case or any registered complaint is found in a source, this item receives a score of 1. In all cases, a score of 0 is given if there is no measure found.

In terms of weights, all three items get the same weights, i.e. 33.3 percent within this subchapter.

### OTHER MEASURES

The final subchapter records additional measures that do not fall directly in any of the other subchapter, but still relate to standards. This subchapter accounts for a weight of 10 percent.

### SOURCES

This chapter is mainly based on complaints from international stakeholders, both public and private. Other sources are policy papers and literature from governmental and private business organisations as well as the USTR Report on Technical Barriers to Trade, reports from the Telecommunications Industry Association (TIA), which represents manufacturers and suppliers of global communication networks and the International Telecommunication Unit (ITU), the UN specialised agency for information and telecommunication technologies.

## 4.2.13 Chapter 13: Online Sales and Transactions

Chapter 13 considers cost-enhancing measures that obstruct the efficient flow of online sales and transactions.

Although the seamless structure of the internet makes it in theory possible to match consumers and sellers from anywhere across the world, in practice many hurdles still remain that hold back the development of online sales and transactions. This chapter focuses mainly on the Business-to-Consumer (B2C) segment of online sales and transactions such as e-commerce, but also involves other segments. As such, this chapter is broader than e-commerce only and focuses generally on conducting operations online. For that reason, various additional issues are covered such as the delivery of goods, the provision of online services, the exclusion of items that can be sold online, or electronic payment and contracting issues.

In many parts of the world, additional obstacles to online transactions exist due to insufficient infrastructure, low internet penetration, a sub-optimal performing postal services sector or non-existent physical addresses and zip codes. Although these items form a real obstruction to the development of online sales and transactions, they are not included in the database as they are enabling factors that rather reflect the development stage of a country as opposed to implemented regulatory policy measures. Hence, this chapter only includes country-specific regulatory policy measures related to online sales and transactions.

As a final note, some specific regulations regarding e-commerce can be found in other chapters of the index where relevant. For instance, Chapter 4 on investments covers investment restrictions on e-commerce activities that exist in some countries, whilst Chapter 2 includes specific taxes on e-commerce.

### SUBCHAPTERS, WEIGHTS AND SCORING

Chapter 13 has four subchapters, each taking up specific measures related to a distinct field of online sales and transaction. They cover (i) barriers to fulfillment, (ii) domain name registration requirements, (iii) online sales restrictions, and (iv) discriminatory/disproportionate consumer protection.

**Table 4.17**: Subchapters and Weights for Chapter 13

| Subchapter | | Items covered | Weighting |
|---|---|---|---|
| **13.1** | **Barriers to fulfillment** | | **0.5** |
| | 13.1.1 | Restriction to online sales and transactions | 0.5 |
| | 13.1.2 | Restriction to online payment | 0.3 |
| | 13.1.3 | Low threshold for De Minimis rule | 0.2 |
| **13.2** | **Domain name (DNS) registration requirements** | | **0.25** |
| | 13.2.1 | Local domain requirement for electronic retail | 0.6 |
| | 13.2.2 | Physical presence requirement for a local domain name | 0.4 |
| **13.3** | **Online sales** | | **0.15** |
| | 13.3.1 | Restriction to online sales of specific products | 1 |
| **13.4** | **Discriminatory consumer protection law for online sales** | | **0.1** |
| | 13.4.1 | Discriminatory consumer protection law for online sales | 1 |

Table 4.17 shows how weights have been allocated among these four subchapters as part of the overall chapter index. The first and second subchapters receive higher weights compared to the other two subchapters, with the first one representing 50 percent and the second one representing 25 percent. The reason for giving a higher weight to the first subchapter is that measures included in this section can create serious costs for businesses when operating online and, in some cases, can even make it impossible. Bans on online sales are usually limited to a specific product or service, and therefore their weight is lower compared with the previous subchapters. Finally, cases of discriminatory or disproportionate regulations related to consumer protection receive a weight of 10 percent as they might create certain additional costs for businesses in specific situations. Table 4.17 also shows how the specific measures within each subchapter are put into relative importance by using weights.

## BARRIERS TO FULFILLMENT

This subchapter is divided into three types of measures. The first measure covers general barriers to the fulfillment of online sales and transactions. The policies taken up as part of this category are wide-ranging but all increase costs for domestic as well as foreign firms operating online. These measures vary from licensing requirements for e-commerce platforms to specific limits on the number of goods that can be imported by customers through e-commerce platforms. This category also includes reports of burdensome customs procedures for express delivery or quotas. In terms of scoring, for any measure found in this category a score of 1 is assigned. Otherwise, the score remains 0.

The second measure covers restrictions on online payments. Generally, there are various payment methods with which online transactions can be performed, which include credit or debit card, third-party intermediaries, mobile payment or cash on delivery (UNCTAD, 2015). The database contains various restrictions on the use of these methods for online transactions. Examples include the limited use of intermediary online payment systems or a disproportionate cap on the amount that can be paid through an online service. Any such measures found are given a score of 1.

In addition, this category of measures also includes an intermediate score related to the UNCITRAL model laws on Electronic Commerce and on Electronic Signatures. These are two legal frameworks that enable and facilitate online transactions as they prescribe equal treatment to electronic and paper-based information and communication such as contracts, digital messengers or signatures. The two frameworks are essential to enable and facilitate online transactions. When a country has not adopted any of these two legal frameworks, an intermediate score of 0.3 is assigned. If no restrictive measure is in place and the country has adopted the UNCITRAL's model laws on Electronic Commerce and on Electronic Signatures, then a score of 0 is applied.

The third measure looks at the so-called De Minimis rule. This rule is defined as a valuation ceiling for goods below which no duty or tax is charged at the border. To score this measure, an interval is used. If no De Minimis is applied in a country's legal structure, a score of 1 is given. If there is a country that applies De Minimis rule but sets a level below 133 Special Drawing Rights (SDR), a score of 0.5 is assigned.[24] On the other hand, if a country applies the De Minimis rule equal or above 133 SDR, a score of 0 is applied.

The first type of measure in this subchapter receives the highest weight of 50 percent as it is considered to be the most burdensome. Restrictions on online payment and the low threshold for the De Minimis rule are given lower weights of 30 and 20 percent respectively.

[24] SDR is a calculated deflator, based on inflation measures of the economies represented in a basket of currencies and takes stock for international inflation and exchange rates.

## DOMAIN NAME REGISTRATION REQUIREMENTS

Every country has its own so-called country-code top-level domain (ccTLD), which is the country indication on a web link such as ".be" for Belgium or ".in" for India. Firms engaged in online transactions often want to brand themselves locally and, by creating local websites with national domain names, they can increase their online sales activities by raising brand awareness and create loyalty and trust.

There are two types of measures within this subchapter. The first measure is the requirement for a company to have a local domain name in order to engage in electronic retail in a certain market. In terms of scoring, a score of 1 is assigned for any of such measure found that a country applies for more than one sector. A score of 0.5 is given if this rule only applies to one sector or to a specific category of products. If companies are not required to operate with a specific local domain name, then a score of 0 is assigned.

The second measure is the requirement to establish a local presence in order to use a local domain name. Interval scoring is used to take into account different ways in which this requirement can occur. That is, in case the actual presence of the company in a country is required, a score of 1 is assigned. In other countries, however, only a local administrative contact is required. This measure is less burdensome and, if a country requires this form of presence, a score of 0.5 is assigned. In cases when the firm only has to "show an interest in the country", such as targeting the country for sales or looking to establish in the country, a score of 0.1 is applied. A similar score of 0.1 is also given if the requirement to have a local presence only applies to the use of a second-level domain such as ".co.uk" before the country domain name. It should be mentioned that it is not uncommon to restrict a number of second-level domains for certain government agencies, educational institutions or other types of organisations with second-level domain names such as ".gov", ".edu" or ".org". However, since the database focuses on commercial activities, these cases are excluded.

The requirement to establish a local presence is considered more burdensome than the requirement to have a local domain in order to engage in electronic retail. Therefore, the first measure receives a weight of 60 percent, while the second is given a weight of 40 percent.

## ONLINE SALES

This subchapter has only one measure which identifies situations in which it is prohibited to sell goods or services online, but the same goods or services can nonetheless be sold offline in the same country. There are few countries where this measure applies, and it usually targets a sub-set of sectors. Nonetheless, they form a real obstacle for those firms engaged in these sectors. In terms of scoring, if there is any instance of such bans, a score of 1 is assigned. If, instead, the ban applies to both offline and online sales, then it is not counted as a restriction, and therefore the score of this subchapter remains 0. It is also worth mentioning that measures taken up in this subchapter do not record technical blocking of social media or other online information sites, which go under Chapter 10 of content access.

## DISCRIMINATORY CONSUMER PROTECTION

The last issue that is addressed in this chapter covers instances in which there is a discriminatory or disproportionate consumer protection policy that is being applied online. Policy rules on consumer protection online are important as the information asymmetry on the net may be greater than in the offline world. An e-commerce consumer protection law generally deals with issues of responsibilities and requirements of the seller, such as providing sufficient information and on-time delivery, or the rights of the consumer such as faulty goods and returns.

For this index, the online consumer protection policy is quantified as a restrictive measure only when applied in a discriminatory or disproportionate way. Regulations ensuring the same protection for online and offline sales, or similar treatment for e-commerce and other types of distance contracts such as

telephone sales, are not regarded as a policy obstacle for online transactions. Therefore, in these cases, the score of the subchapters remains 0. However, legislation that imposes stricter regulation for online consumer protection than offline transactions receives a score of 1. An intermediate score of 0.5 is applied when there is a lack of regulation and the country is reported to not provide sufficient consumer protection online. Lack of consumer protection is seen as an obstacle to e-commerce development as consumers usually lack trust and confidence without sufficient protection.

## SOURCES

For this chapter, several sources were used such as government reports including the USTR's Report on Foreign Trade Barriers but also reports from businesses. In addition, legal texts and legislations have been used as a source, as well as analyses from law firms and official reports from UN organisations such as UNCITRAL and UNCTAD. Information on domain name regulation has generally been found on register's websites of each country.[25]

[25] Registers are organisations and foundations assigned with the responsibility of registering the country-level domain in each country.

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# Annex A: DTRI Cluster and Chapter Tables

**Table A1**: DTRI Score and Ranking, including Clusters A-D

| | DTRI | | A. Fiscal Restrictions & Market Access | | B. Establishment Restrictions | | C. Restrictions on Data | | D. Trading Restrictions | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | Index | Rank | Index | Rank | Index | Rank | Index | Rank | Index | Rank |
| **CHN** | **0.70** | **1** | 0.60 | 3 | 0.77 | 1 | 0.82 | 1 | 0.63 | 1 |
| **RUS** | **0.46** | **2** | 0.40 | 9 | 0.40 | 9 | 0.63 | 2 | 0.43 | 6 |
| **IND** | **0.44** | **3** | 0.63 | 1 | 0.40 | 8 | 0.31 | 16 | 0.40 | 7 |
| **IDN** | **0.43** | **4** | 0.43 | 6 | 0.36 | 13 | 0.44 | 5 | 0.48 | 5 |
| **VNM** | **0.41** | **5** | 0.22 | 36 | 0.50 | 3 | 0.43 | 6 | 0.51 | 3 |
| **BRA** | **0.40** | **6** | 0.62 | 2 | 0.33 | 17 | 0.15 | 54 | 0.49 | 4 |
| **TUR** | **0.38** | **7** | 0.35 | 11 | 0.22 | 42 | 0.60 | 3 | 0.37 | 8 |
| **ARG** | **0.38** | **8** | 0.49 | 4 | 0.28 | 28 | 0.17 | 49 | 0.57 | 2 |
| **FRA** | **0.36** | **9** | 0.26 | 22 | 0.40 | 10 | 0.45 | 4 | 0.33 | 12 |
| **THA** | **0.35** | **10** | 0.27 | 18 | 0.54 | 2 | 0.29 | 20 | 0.28 | 17 |
| **MYS** | **0.34** | **11** | 0.20 | 50 | 0.45 | 5 | 0.35 | 11 | 0.35 | 10 |
| **PAK** | **0.33** | **12** | 0.49 | 5 | 0.21 | 44 | 0.30 | 17 | 0.31 | 13 |
| **DEU** | **0.33** | **13** | 0.24 | 28 | 0.40 | 11 | 0.41 | 7 | 0.26 | 21 |
| **ECU** | **0.32** | **14** | 0.31 | 15 | 0.42 | 7 | 0.20 | 39 | 0.35 | 9 |
| **KOR** | **0.31** | **15** | 0.33 | 13 | 0.25 | 34 | 0.39 | 8 | 0.28 | 16 |
| **NGA** | **0.29** | **16** | 0.41 | 8 | 0.19 | 46 | 0.23 | 32 | 0.34 | 11 |
| **ZAF** | **0.27** | **17** | 0.43 | 7 | 0.34 | 15 | 0.20 | 38 | 0.11 | 46 |
| **MEX** | **0.27** | **18** | 0.24 | 25 | 0.30 | 25 | 0.26 | 23 | 0.27 | 19 |
| **ROU** | **0.27** | **19** | 0.24 | 32 | 0.31 | 24 | 0.27 | 21 | 0.25 | 22 |
| **BRN** | **0.26** | **20** | 0.27 | 19 | 0.32 | 22 | 0.38 | 9 | 0.08 | 54 |
| **ESP** | **0.26** | **21** | 0.21 | 45 | 0.23 | 40 | 0.30 | 18 | 0.29 | 15 |
| **USA** | **0.26** | **22** | 0.37 | 10 | 0.38 | 12 | 0.15 | 53 | 0.12 | 43 |
| **TWN** | **0.25** | **23** | 0.13 | 56 | 0.46 | 4 | 0.12 | 59 | 0.30 | 14 |
| **GRC** | **0.24** | **24** | 0.33 | 12 | 0.31 | 23 | 0.23 | 30 | 0.10 | 50 |
| **ITA** | **0.24** | **25** | 0.28 | 17 | 0.11 | 59 | 0.31 | 14 | 0.25 | 25 |
| **HUN** | **0.23** | **26** | 0.26 | 21 | 0.15 | 54 | 0.30 | 19 | 0.22 | 27 |
| **AUS** | **0.23** | **27** | 0.25 | 24 | 0.28 | 27 | 0.25 | 25 | 0.15 | 36 |
| **SVK** | **0.23** | **28** | 0.21 | 44 | 0.33 | 19 | 0.19 | 44 | 0.20 | 29 |
| **CAN** | **0.23** | **29** | 0.10 | 59 | 0.29 | 26 | 0.25 | 27 | 0.26 | 20 |
| **CHE** | **0.22** | **30** | 0.17 | 54 | 0.44 | 6 | 0.25 | 26 | 0.03 | 63 |
| **FIN** | **0.22** | **31** | 0.21 | 47 | 0.19 | 48 | 0.33 | 13 | 0.16 | 35 |
| **PHL** | **0.22** | **32** | 0.27 | 20 | 0.34 | 16 | 0.11 | 61 | 0.17 | 33 |
| **BEL** | **0.22** | **33** | 0.21 | 41 | 0.33 | 18 | 0.19 | 45 | 0.15 | 37 |
| **POL** | **0.22** | **34** | 0.21 | 43 | 0.20 | 45 | 0.27 | 22 | 0.20 | 28 |
| **DNK** | **0.22** | **35** | 0.20 | 48 | 0.16 | 53 | 0.35 | 10 | 0.15 | 39 |
| **LTU** | **0.21** | **36** | 0.24 | 30 | 0.12 | 57 | 0.34 | 12 | 0.15 | 40 |

| | DTRI | | A. Fiscal Restrictions & Market Access | | B. Establishment Restrictions | | C. Restrictions on Data | | D. Trading Restrictions | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | Index | Rank | Index | Rank | Index | Rank | Index | Rank | Index | Rank |
| **EUR** | **0.21** | **37** | 0.23 | 33 | 0.21 | 43 | 0.24 | 29 | 0.16 | 34 |
| **PRY** | **0.21** | **38** | 0.32 | 14 | 0.24 | 35 | 0.16 | 52 | 0.11 | 45 |
| **COL** | **0.20** | **39** | 0.12 | 57 | 0.32 | 21 | 0.23 | 31 | 0.14 | 42 |
| **SWE** | **0.20** | **40** | 0.21 | 46 | 0.23 | 38 | 0.26 | 24 | 0.10 | 52 |
| **BGR** | **0.20** | **41** | 0.24 | 26 | 0.32 | 20 | 0.14 | 55 | 0.07 | 57 |
| **ISR** | **0.19** | **42** | 0.13 | 55 | 0.22 | 41 | 0.18 | 47 | 0.23 | 26 |
| **HRV** | **0.19** | **43** | 0.21 | 42 | 0.18 | 50 | 0.11 | 60 | 0.25 | 23 |
| **GBR** | **0.19** | **44** | 0.25 | 23 | 0.09 | 62 | 0.31 | 15 | 0.10 | 53 |
| **AUT** | **0.19** | **45** | 0.21 | 40 | 0.23 | 39 | 0.21 | 37 | 0.10 | 49 |
| **PRT** | **0.19** | **46** | 0.23 | 34 | 0.25 | 31 | 0.22 | 36 | 0.05 | 61 |
| **CZE** | **0.18** | **47** | 0.24 | 27 | 0.18 | 51 | 0.16 | 51 | 0.15 | 38 |
| **CYP** | **0.18** | **48** | 0.21 | 37 | 0.12 | 58 | 0.14 | 56 | 0.25 | 24 |
| **SVN** | **0.18** | **49** | 0.21 | 38 | 0.13 | 56 | 0.18 | 48 | 0.20 | 30 |
| **JPN** | **0.18** | **50** | 0.21 | 39 | 0.35 | 14 | 0.04 | 62 | 0.11 | 48 |
| **EST** | **0.18** | **51** | 0.20 | 49 | 0.14 | 55 | 0.20 | 41 | 0.17 | 32 |
| **LUX** | **0.17** | **52** | 0.19 | 52 | 0.19 | 47 | 0.20 | 40 | 0.10 | 51 |
| **LVA** | **0.17** | **53** | 0.24 | 29 | 0.19 | 49 | 0.20 | 43 | 0.05 | 59 |
| **NLD** | **0.17** | **54** | 0.24 | 31 | 0.25 | 33 | 0.13 | 58 | 0.05 | 60 |
| **MLT** | **0.16** | **55** | 0.19 | 53 | 0.09 | 61 | 0.22 | 33 | 0.15 | 41 |
| **CHL** | **0.15** | **56** | 0.28 | 16 | 0.17 | 52 | 0.04 | 63 | 0.12 | 44 |
| **SGP** | **0.15** | **57** | 0.02 | 65 | 0.24 | 37 | 0.25 | 28 | 0.11 | 47 |
| **PER** | **0.15** | **58** | 0.11 | 58 | 0.24 | 36 | 0.22 | 34 | 0.05 | 62 |
| **CRI** | **0.14** | **59** | 0.09 | 61 | 0.26 | 30 | 0.04 | 64 | 0.19 | 31 |
| **PAN** | **0.13** | **60** | 0.22 | 35 | 0.27 | 29 | 0.03 | 65 | 0.02 | 64 |
| **HKG** | **0.13** | **61** | 0.02 | 64 | 0.07 | 65 | 0.16 | 50 | 0.27 | 18 |
| **IRL** | **0.13** | **62** | 0.19 | 51 | 0.07 | 63 | 0.20 | 42 | 0.05 | 58 |
| **NOR** | **0.13** | **63** | 0.05 | 63 | 0.25 | 32 | 0.13 | 57 | 0.08 | 56 |
| **ISL** | **0.11** | **64** | 0.09 | 60 | 0.10 | 60 | 0.19 | 46 | 0.08 | 55 |
| **NZL** | **0.09** | **65** | 0.08 | 62 | 0.07 | 64 | 0.22 | 35 | 0.00 | 65 |

**Table A2**: DTRI Cluster A Score and Ranking, including Chapters 1-3

| | A. Fiscal Restrictions & Market Access | | Tariffs and Trade Defence | Taxation & Subsidies | Public Procurement |
|---|---|---|---|---|---|
| **Country** | **Index** | **Rank** | **Rank** | **Rank** | **Rank** |
| **IND** | **0.63** | **1** | 4 | 7 | 2 |
| **BRA** | **0.62** | **2** | 2 | 1 | 8 |
| **CHN** | **0.60** | **3** | 10 | 4 | 1 |
| **ARG** | **0.49** | **4** | 1 | 3 | 27 |
| **PAK** | **0.49** | **5** | 3 | 5 | 21 |
| **IDN** | **0.43** | **6** | 13 | 48 | 4 |
| **ZAF** | **0.43** | **7** | 45 | 39 | 3 |
| **NGA** | **0.41** | **8** | 5 | 10 | 15 |
| **RUS** | **0.40** | **9** | 6 | 15 | 12 |
| **USA** | **0.37** | **10** | 51 | 14 | 5 |
| **TUR** | **0.35** | **11** | 43 | 2 | 14 |
| **GRC** | **0.33** | **12** | 26 | 25 | 10 |
| **KOR** | **0.33** | **13** | 48 | 13 | 7 |
| **PRY** | **0.32** | **14** | 9 | 37 | 16 |
| **ECU** | **0.31** | **15** | 47 | 19 | 6 |
| **CHL** | **0.28** | **16** | 8 | 11 | 43 |
| **ITA** | **0.28** | **17** | 29 | 26 | 17 |
| **THA** | **0.27** | **18** | 12 | 41 | 25 |
| **BRN** | **0.27** | **19** | 7 | 50 | 28 |
| **PHL** | **0.27** | **20** | 11 | 63 | 23 |
| **HUN** | **0.26** | **21** | 27 | 12 | 34 |
| **FRA** | **0.26** | **22** | 24 | 6 | 51 |
| **GBR** | **0.25** | **23** | 42 | 57 | 18 |
| **AUS** | **0.25** | **24** | 52 | 49 | 9 |
| **MEX** | **0.24** | **25** | 49 | 9 | 26 |
| **BGR** | **0.24** | **26** | 17 | 51 | 19 |
| **CZE** | **0.24** | **27** | 20 | 23 | 32 |
| **DEU** | **0.24** | **28** | 25 | 24 | 33 |
| **LVA** | **0.24** | **29** | 30 | 27 | 35 |
| **LTU** | **0.24** | **30** | 31 | 28 | 36 |
| **NLD** | **0.24** | **31** | 34 | 29 | 37 |
| **ROU** | **0.24** | **32** | 37 | 31 | 39 |
| **EUR** | **0.23** | **33** | 14 | 43 | 42 |
| **PRT** | **0.23** | **34** | 36 | 47 | 38 |
| **PAN** | **0.22** | **35** | 44 | 62 | 22 |
| **VNM** | **0.22** | **36** | 46 | 65 | 24 |
| **CYP** | **0.21** | **37** | 19 | 52 | 31 |

| | A. Fiscal Restrictions & Market Access | | Tariffs and Trade Defence | Taxation & Subsidies | Public Procurement |
|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank |
| SVN | 0.21 | 38 | 39 | 56 | 40 |
| JPN | 0.21 | 39 | 62 | 8 | 13 |
| AUT | 0.21 | 40 | 15 | 20 | 45 |
| BEL | 0.21 | 41 | 16 | 21 | 46 |
| HRV | 0.21 | 42 | 18 | 22 | 47 |
| POL | 0.21 | 43 | 35 | 30 | 55 |
| SVK | 0.21 | 44 | 38 | 32 | 56 |
| ESP | 0.21 | 45 | 40 | 33 | 57 |
| SWE | 0.21 | 46 | 41 | 34 | 58 |
| FIN | 0.21 | 47 | 23 | 42 | 50 |
| DNK | 0.20 | 48 | 21 | 45 | 48 |
| EST | 0.20 | 49 | 22 | 46 | 49 |
| MYS | 0.20 | 50 | 55 | 60 | 11 |
| IRL | 0.19 | 51 | 28 | 53 | 52 |
| LUX | 0.19 | 52 | 32 | 54 | 53 |
| MLT | 0.19 | 53 | 33 | 55 | 54 |
| CHE | 0.17 | 54 | 50 | 16 | 63 |
| ISR | 0.13 | 55 | 59 | 35 | 20 |
| TWN | 0.13 | 56 | 54 | 40 | 64 |
| COL | 0.12 | 57 | 58 | 17 | 30 |
| PER | 0.11 | 58 | 61 | 38 | 41 |
| CAN | 0.10 | 59 | 57 | 44 | 29 |
| ISL | 0.09 | 60 | 56 | 59 | 60 |
| CRI | 0.09 | 61 | 60 | 18 | 44 |
| NZL | 0.08 | 62 | 53 | 61 | 65 |
| NOR | 0.05 | 63 | 64 | 36 | 61 |
| HKG | 0.02 | 64 | 63 | 58 | 59 |
| SGP | 0.02 | 65 | 65 | 64 | 62 |

**Table A3**: DTRI Cluster B Score and Ranking, including Chapters 4-7

| | B. Establishment Restrictions | | Foreign Investment | IPR | Competition Policy | Business Mobility |
|---|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank | Rank |
| CHN | 0.77 | 1 | 1 | 1 | 1 | 30 |
| THA | 0.54 | 2 | 3 | 7 | 7 | 26 |
| VNM | 0.50 | 3 | 10 | 18 | 8 | 18 |
| TWN | 0.46 | 4 | 6 | 9 | 20 | 14 |
| MYS | 0.45 | 5 | 16 | 41 | 6 | 24 |
| CHE | 0.44 | 6 | 14 | 17 | 19 | 6 |
| ECU | 0.42 | 7 | 17 | 4 | 14 | 36 |
| IND | 0.40 | 8 | 5 | 8 | 45 | 19 |
| RUS | 0.40 | 9 | 8 | 16 | 48 | 2 |
| FRA | 0.40 | 10 | 22 | 38 | 4 | 22 |
| DEU | 0.40 | 11 | 27 | 12 | 5 | 42 |
| USA | 0.38 | 12 | 13 | 63 | 9 | 46 |
| IDN | 0.36 | 13 | 12 | 10 | 46 | 23 |
| JPN | 0.35 | 14 | 9 | 24 | 36 | 28 |
| ZAF | 0.34 | 15 | 50 | 46 | 2 | 7 |
| PHL | 0.34 | 16 | 7 | 54 | 38 | 10 |
| BRA | 0.33 | 17 | 15 | 39 | 26 | 21 |
| BEL | 0.33 | 18 | 19 | 42 | 24 | 31 |
| SVK | 0.33 | 19 | 44 | 33 | 3 | 55 |
| BGR | 0.32 | 20 | 47 | 13 | 12 | 9 |
| COL | 0.32 | 21 | 30 | 25 | 10 | 35 |
| BRN | 0.32 | 22 | 20 | 19 | 40 | 4 |
| GRC | 0.31 | 23 | 29 | 22 | 21 | 12 |
| ROU | 0.31 | 24 | 49 | 32 | 23 | 1 |
| MEX | 0.30 | 25 | 32 | 34 | 11 | 37 |
| CAN | 0.29 | 26 | 2 | 40 | 53 | 41 |
| AUS | 0.28 | 27 | 4 | 45 | 52 | 20 |
| ARG | 0.28 | 28 | 28 | 3 | 27 | 57 |
| PAN | 0.27 | 29 | 36 | 61 | 18 | 3 |
| CRI | 0.26 | 30 | 31 | 26 | 13 | 58 |
| PRT | 0.25 | 31 | 60 | 31 | 22 | 15 |
| NOR | 0.25 | 32 | 18 | 35 | 47 | 64 |
| NLD | 0.25 | 33 | 40 | 5 | 32 | 44 |
| KOR | 0.25 | 34 | 11 | 36 | 64 | 59 |
| PRY | 0.24 | 35 | 38 | 20 | 25 | 65 |
| PER | 0.24 | 36 | 65 | 6 | 37 | 17 |
| SGP | 0.24 | 37 | 24 | 62 | 49 | 5 |
| SWE | 0.23 | 38 | 37 | 44 | 16 | 63 |
| AUT | 0.23 | 39 | 41 | 21 | 41 | 11 |

| | B. Establishment Restrictions | | Foreign Investment | IPR | Competition Policy | Business Mobility |
|---|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank | Rank |
| **ESP** | **0.23** | **40** | 62 | 2 | 34 | 48 |
| **ISR** | **0.22** | **41** | 21 | 53 | 35 | 33 |
| **TUR** | **0.22** | **42** | 26 | 55 | 39 | 27 |
| **EUR** | **0.21** | **43** | 46 | 37 | 29 | 39 |
| **PAK** | **0.21** | **44** | 64 | 48 | 17 | 29 |
| **POL** | **0.20** | **45** | 59 | 15 | 33 | 45 |
| **NGA** | **0.19** | **46** | 25 | 65 | 51 | 25 |
| **LUX** | **0.19** | **47** | 57 | 52 | 15 | 47 |
| **FIN** | **0.19** | **48** | 23 | 51 | 50 | 51 |
| **LVA** | **0.19** | **49** | 35 | 29 | 43 | 54 |
| **HRV** | **0.18** | **50** | 51 | 11 | 54 | 8 |
| **CZE** | **0.18** | **51** | 53 | 27 | 28 | 60 |
| **CHL** | **0.17** | **52** | 33 | 56 | 30 | 38 |
| **DNK** | **0.16** | **53** | 34 | 50 | 31 | 50 |
| **HUN** | **0.15** | **54** | 55 | 14 | 56 | 16 |
| **EST** | **0.14** | **55** | 54 | 28 | 55 | 13 |
| **SVN** | **0.13** | **56** | 61 | 58 | 44 | 34 |
| **LTU** | **0.12** | **57** | 56 | 23 | 59 | 43 |
| **CYP** | **0.12** | **58** | 52 | 49 | 42 | 49 |
| **ITA** | **0.11** | **59** | 42 | 43 | 58 | 53 |
| **ISL** | **0.10** | **60** | 45 | 60 | 63 | 32 |
| **MLT** | **0.09** | **61** | 58 | 30 | 60 | 62 |
| **GBR** | **0.09** | **62** | 43 | 59 | 61 | 40 |
| **IRL** | **0.07** | **63** | 48 | 57 | 57 | 52 |
| **NZL** | **0.07** | **64** | 39 | 64 | 65 | 61 |
| **HKG** | **0.07** | **65** | 63 | 47 | 62 | 56 |

**Table A4**: DTRI Cluster C Score and Ranking, including Chapters 8-10

| | C. Restrictions on Data | | Data Policies | Intermediary Liability | Content Access |
|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank |
| **CHN** | **0.82** | **1** | 3 | 1 | 1 |
| **RUS** | **0.63** | **2** | 1 | 18 | 4 |
| **TUR** | **0.60** | **3** | 2 | 2 | 11 |
| **FRA** | **0.45** | **4** | 5 | 20 | 12 |
| **IDN** | **0.44** | **5** | 18 | 9 | 6 |
| **VNM** | **0.43** | **6** | 9 | 51 | 2 |
| **DEU** | **0.41** | **7** | 4 | 30 | 13 |
| **KOR** | **0.39** | **8** | 6 | 23 | 26 |
| **BRN** | **0.38** | **9** | 44 | 4 | 5 |
| **DNK** | **0.35** | **10** | 7 | 27 | 15 |
| **MYS** | **0.35** | **11** | 55 | 45 | 3 |
| **LTU** | **0.34** | **12** | 29 | 7 | 20 |
| **FIN** | **0.33** | **13** | 10 | 29 | 16 |
| **ITA** | **0.31** | **14** | 11 | 34 | 19 |
| **GBR** | **0.31** | **15** | 12 | 43 | 23 |
| **IND** | **0.31** | **16** | 42 | 22 | 8 |
| **PAK** | **0.30** | **17** | 54 | 14 | 9 |
| **ESP** | **0.30** | **18** | 15 | 42 | 25 |
| **HUN** | **0.30** | **19** | 20 | 32 | 18 |
| **THA** | **0.29** | **20** | 62 | 3 | 10 |
| **ROU** | **0.27** | **21** | 34 | 39 | 22 |
| **POL** | **0.27** | **22** | 8 | 38 | 34 |
| **MEX** | **0.26** | **23** | 23 | 11 | 59 |
| **SWE** | **0.26** | **24** | 17 | 21 | 54 |
| **AUS** | **0.25** | **25** | 14 | 52 | 14 |
| **CHE** | **0.25** | **26** | 37 | 17 | 36 |
| **CAN** | **0.25** | **27** | 13 | 50 | 27 |
| **SGP** | **0.25** | **28** | 38 | 64 | 7 |
| **EUR** | **0.24** | **29** | 21 | 49 | 29 |
| **GRC** | **0.23** | **30** | 16 | 31 | 33 |
| **COL** | **0.23** | **31** | 43 | 5 | 40 |
| **NGA** | **0.23** | **32** | 45 | 13 | 60 |
| **MLT** | **0.22** | **33** | 19 | 37 | 51 |
| **PER** | **0.22** | **34** | 48 | 16 | 63 |
| **NZL** | **0.22** | **35** | 49 | 12 | 35 |
| **PRT** | **0.22** | **36** | 30 | 60 | 21 |
| **AUT** | **0.21** | **37** | 31 | 55 | 17 |
| **ZAF** | **0.20** | **38** | 51 | 47 | 28 |

| | C. Restrictions on Data | | Data Policies | Intermediary Liability | Content Access |
|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank |
| **ECU** | **0.20** | **39** | 65 | 6 | 24 |
| **LUX** | **0.20** | **40** | 25 | 36 | 50 |
| **EST** | **0.20** | **41** | 26 | 28 | 47 |
| **IRL** | **0.20** | **42** | 27 | 33 | 48 |
| **LVA** | **0.20** | **43** | 28 | 35 | 49 |
| **SVK** | **0.19** | **44** | 47 | 40 | 30 |
| **BEL** | **0.19** | **45** | 32 | 25 | 42 |
| **ISL** | **0.19** | **46** | 35 | 44 | 56 |
| **ISR** | **0.18** | **47** | 56 | 10 | 57 |
| **SVN** | **0.18** | **48** | 39 | 41 | 53 |
| **ARG** | **0.17** | **49** | 52 | 19 | 38 |
| **HKG** | **0.16** | **50** | 61 | 8 | 55 |
| **CZE** | **0.16** | **51** | 46 | 26 | 46 |
| **PRY** | **0.16** | **52** | 64 | 15 | 31 |
| **USA** | **0.15** | **53** | 50 | 48 | 37 |
| **BRA** | **0.15** | **54** | 57 | 24 | 32 |
| **BGR** | **0.14** | **55** | 22 | 56 | 43 |
| **CYP** | **0.14** | **56** | 24 | 58 | 45 |
| **NOR** | **0.13** | **57** | 53 | 46 | 61 |
| **NLD** | **0.13** | **58** | 33 | 59 | 52 |
| **TWN** | **0.12** | **59** | 36 | 65 | 65 |
| **HRV** | **0.11** | **60** | 40 | 57 | 44 |
| **PHL** | **0.11** | **61** | 41 | 63 | 64 |
| **JPN** | **0.04** | **62** | 58 | 61 | 58 |
| **CHL** | **0.04** | **63** | 59 | 53 | 39 |
| **CRI** | **0.04** | **64** | 60 | 54 | 41 |
| **PAN** | **0.03** | **65** | 63 | 62 | 62 |

**Table A5**: DTRI Cluster D Score and Ranking, including Chapters 11-13

| | D. Trading Restrictions | | Quantitative Trade Restrictions | Standards | Online Sales & Transactions |
|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank |
| **CHN** | **0.63** | **1** | 2 | 1 | 5 |
| **ARG** | **0.57** | **2** | 1 | 19 | 2 |
| **VNM** | **0.51** | **3** | 10 | 4 | 1 |
| **BRA** | **0.49** | **4** | 3 | 8 | 4 |
| **IDN** | **0.48** | **5** | 6 | 10 | 3 |
| **RUS** | **0.43** | **6** | 9 | 17 | 8 |
| **IND** | **0.40** | **7** | 28 | 2 | 12 |
| **TUR** | **0.37** | **8** | 4 | 12 | 34 |
| **ECU** | **0.35** | **9** | 5 | 9 | 32 |
| **MYS** | **0.35** | **10** | 7 | 29 | 13 |
| **NGA** | **0.34** | **11** | 8 | 18 | 24 |
| **FRA** | **0.33** | **12** | 16 | 43 | 6 |
| **PAK** | **0.31** | **13** | 27 | 5 | 33 |
| **TWN** | **0.30** | **14** | 65 | 6 | 7 |
| **ESP** | **0.29** | **15** | 25 | 58 | 11 |
| **KOR** | **0.28** | **16** | 57 | 3 | 10 |
| **THA** | **0.28** | **17** | 33 | 20 | 15 |
| **HKG** | **0.27** | **18** | 26 | 16 | 31 |
| **MEX** | **0.27** | **19** | 34 | 11 | 14 |
| **CAN** | **0.26** | **20** | 31 | 13 | 27 |
| **DEU** | **0.26** | **21** | 41 | 21 | 9 |
| **ROU** | **0.25** | **22** | 22 | 55 | 18 |
| **HRV** | **0.25** | **23** | 12 | 38 | 19 |
| **CYP** | **0.25** | **24** | 13 | 39 | 20 |
| **ITA** | **0.25** | **25** | 18 | 47 | 22 |
| **ISR** | **0.23** | **26** | 29 | 7 | 63 |
| **HUN** | **0.22** | **27** | 17 | 45 | 29 |
| **POL** | **0.20** | **28** | 21 | 53 | 42 |
| **SVK** | **0.20** | **29** | 23 | 56 | 43 |
| **SVN** | **0.20** | **30** | 24 | 57 | 44 |
| **CRI** | **0.19** | **31** | 54 | 15 | 16 |
| **EST** | **0.17** | **32** | 15 | 42 | 50 |
| **PHL** | **0.17** | **33** | 36 | 26 | 25 |
| **EUR** | **0.16** | **34** | 32 | 32 | 38 |
| **FIN** | **0.16** | **35** | 40 | 24 | 28 |
| **AUS** | **0.15** | **36** | 30 | 34 | 47 |
| **BEL** | **0.15** | **37** | 11 | 36 | 55 |
| **CZE** | **0.15** | **38** | 14 | 40 | 56 |

| | D. Trading Restrictions | | Quantitative Trade Restrictions | Standards | Online Sales & Transactions |
|---|---|---|---|---|---|
| Country | Index | Rank | Rank | Rank | Rank |
| **DNK** | **0.15** | **39** | 39 | 41 | 21 |
| **LTU** | **0.15** | **40** | 19 | 49 | 58 |
| **MLT** | **0.15** | **41** | 20 | 51 | 59 |
| **COL** | **0.14** | **42** | 53 | 28 | 17 |
| **USA** | **0.12** | **43** | 50 | 33 | 30 |
| **CHL** | **0.12** | **44** | 52 | 14 | 46 |
| **PRY** | **0.11** | **45** | 35 | 25 | 51 |
| **ZAF** | **0.11** | **46** | 63 | 31 | 26 |
| **SGP** | **0.11** | **47** | 62 | 64 | 23 |
| **JPN** | **0.11** | **48** | 56 | 27 | 35 |
| **AUT** | **0.10** | **49** | 37 | 35 | 39 |
| **GRC** | **0.10** | **50** | 42 | 44 | 40 |
| **LUX** | **0.10** | **51** | 45 | 50 | 41 |
| **SWE** | **0.10** | **52** | 48 | 59 | 45 |
| **GBR** | **0.10** | **53** | 49 | 22 | 62 |
| **BRN** | **0.08** | **54** | 51 | 23 | 48 |
| **ISL** | **0.08** | **55** | 55 | 60 | 36 |
| **NOR** | **0.08** | **56** | 59 | 62 | 37 |
| **BGR** | **0.07** | **57** | 38 | 37 | 49 |
| **IRL** | **0.05** | **58** | 43 | 46 | 54 |
| **LVA** | **0.05** | **59** | 44 | 48 | 57 |
| **NLD** | **0.05** | **60** | 46 | 52 | 60 |
| **PRT** | **0.05** | **61** | 47 | 54 | 61 |
| **PER** | **0.05** | **62** | 61 | 30 | 52 |
| **CHE** | **0.03** | **63** | 64 | 65 | 53 |
| **PAN** | **0.02** | **64** | 60 | 63 | 64 |
| **NZL** | **0.00** | **65** | 58 | 61 | 65 |

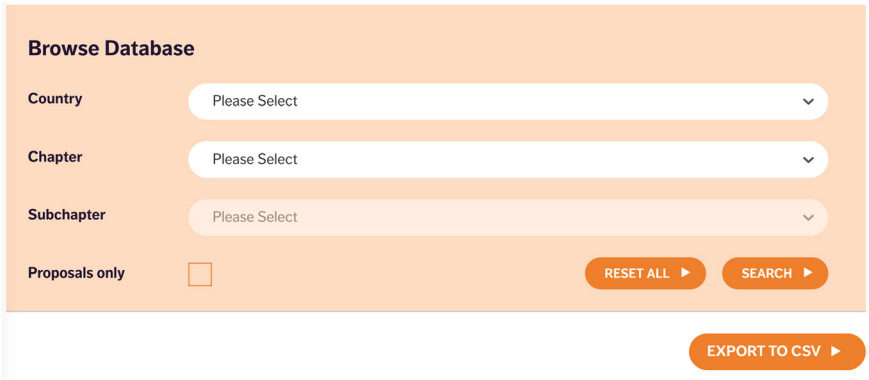
## Annex B: How To Use the DTE Database

This section explains how to navigate through the DTE database. The database allows users to browse through all the measures that were found in the 64 economies selected for the DTE project. The database tool enables users to navigate across more than 1,700 measures related to digital trade which are listed as of December 2017.

Each measure listed in the database contains a detailed description of the measure itself, in addition to detailed information on the name of the chapter and subchapter to which the measure belongs, the law or act behind the measure (when available), the coverage of the measure, the country applying it, as well as the timeframe. The database also discloses the sources where each measure has been found and from where more information can be retrieved.

All this information can be accessed by browsing the DTE website and by clicking on "Database" on the opening page of the website or in the menu. On this page, the user finds an opening menu of the database of which a screenshot is provided in Figure B1. This menu allows users to filter measures according to country, chapter, and subchapter. The option for the subchapter can be selected only after a certain chapter is identified.

**Figure B1**: Opening Menu for DTE Database



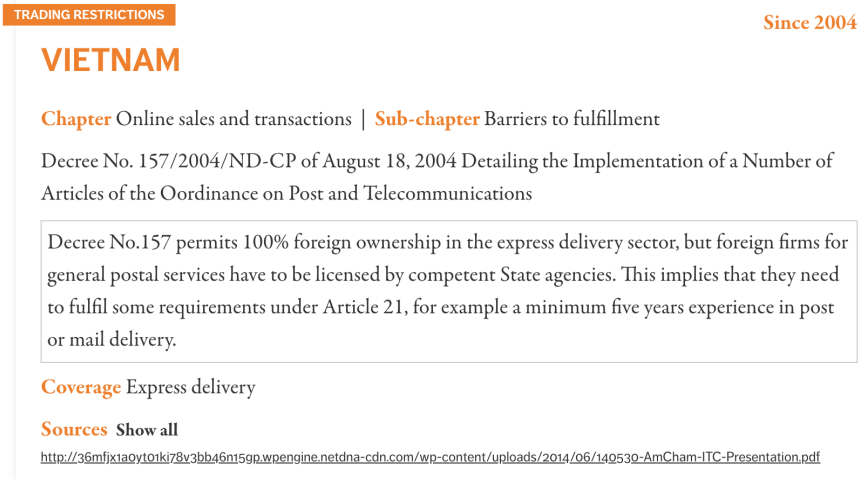

On the opening menu, an additional option is provided which states "proposals only". By clicking on this box, users can limit their search to those measures which are currently being discussed by the government but are not passed into law yet. Not all proposals being discussed are included, only those for which there is already a draft legal text available. The reason for including this option is that there is a high likelihood that eventually these proposed measures will materialise in the near future.

In the opening menu, there are three options available in dark orange at the bottom left corner on which the user can click. They are: "reset all", "search" and "export to CSV". With the "reset all" button the user has the option to reset all selections, whilst by clicking on "search" the user will see all search results on the webpage. When clicking on the button "export to CSV" the user receives all search results in CSV-format.

When clicking on "search", the results are listed in a standard format as presented in Figure B2, which shows an example of a measure that could be selected. As the figure illustrates, each search result presents the following information:

- The name of the country;
- The cluster to which the measure belongs;
- The chapter and subchapter to which the measure belongs;
- The name of the law (if available);
- The timeframe, that is the month and year in which the law was implemented, amended, or, alternatively, the month and year in which the law was reported as a restriction;
- A detailed description of the measure itself;
- The coverage of the measure, that is the product or sector affected; and finally
- The sources where the measure has been found.

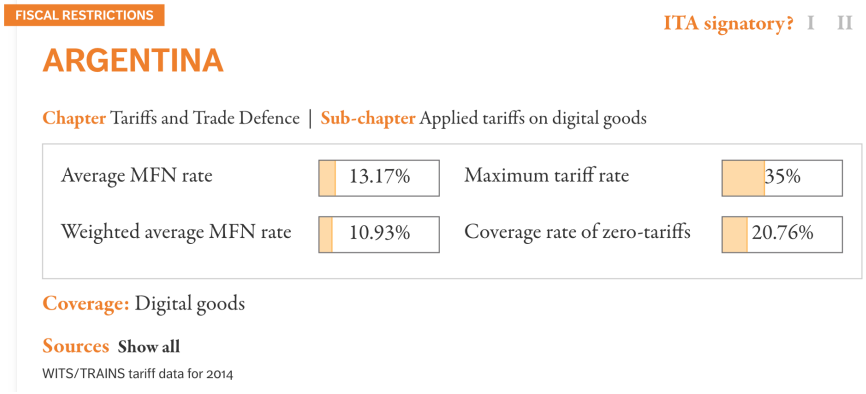
**Figure B2**: Format of Search Results in DTE Database




All measures which are shown on the website have a similar format or layout in the way their search results are presented, as demonstrated in Figure B2, except in the case of tariffs. If the user wishes to see search results for tariffs measures, they are then listed in a standard format as presented in Figure B3 which illustrates another example. Each search result for tariffs will present the following information:

- The name of the country;
- The cluster to which the tariff measure belongs, that is for all tariffs measures Cluster (A) called "Fiscal Restrictions";
- The chapter and subchapter to which the tariff measure belongs, that is for all tariff measures the chapters "Tariffs and Trade defence" and "Applied tariffs on digital goods" respectively;
- Whether the country is a signatory of ITA I and ITA II or not;
- The percentage average MFN rate for digital products;
- The percentage weighted average MFN rate for digital products;
- The percentage maximum tariff rate for digital products;
- The coverage rate of zero-tariffs for digital products;
- The coverage of the measure, that is for all tariffs measures "digital goods"; and finally
- The sources where tariff measure has been found.

**Figure B3**: Format of Search Results in DTE Database for Tariff Measures



## Annex C: Weighting

Creating an index which takes into account more than 100 different types of policy measures requires various steps.

As explained in Section 4, for calculating the DTRI one needs to (i) apply a score for each measure, (ii) assign a weight for each measure within a subchapter, (iii) assign a weight for each chapter itself that belongs to a cluster, and finally (iv) calculate the average of the index results for each of the clusters. Throughout this process, individual policies are aggregated into one index score that summarises the degree of restrictiveness of the country in digital trade.

The choice of applying weights for each chapter and subchapter, therefore, results in a so-called weighted index. An alternative option would be to have an unweighted index so that all measures within the same subchapter and all chapters belonging to the same cluster receive equal importance compared to one another. If that were the case, then the chapter of Taxation and Subsidies, for instance, would have received equal importance compared to the chapters of Tariffs and Trade Defence and Public Procurement.

An unweighted index has some advantages. One is that it is a transparent and straightforward methodology to aggregate all measures into one overall composite indicator (i.e. index). This is particularly suitable when there is a lack of an empirical basis for deciding which measure or chapter is more important than another. In our case, because the DTRI measures the trade restrictiveness in the digital economy, this empirical basis would be each measure's contribution to enhancing costs for digital trade. In order to measure these trade costs, the values of the type of flows of goods, services, and data that are affected by a certain measure taken up in our database would be needed. In our case, this is impossible to do and so one could indeed opt for an unweighted approach.

Yet, the decision to apply unequal weights (i.e. to construct a weighted index) stems from the consideration that within a particular chapter there are policy measures that have a stronger effect in digital trade than others which are more narrowly defined. For instance, a ban to transfer data abroad makes it impossible for the company to provide certain services cross-border, while the need to notify the national authorities of a data breach implies additional costs for companies, but still makes it possible to provide their services. Because of its common subject theme, both measures belong to the same chapter and would have the same impact on the index if it were unweighted.

Moreover, an unweighted approach would bring certain weaknesses, particularly for creating the DTRI. For instance, applying equal weights across all measures and chapters would result in an index which does not take into account the peculiarity of each measure, but rather the number of measures that are included in the database. In other words, with equal weights, the importance of each of these measures would depend on how many of them are included and on how each measure is organised in our subchapters. Since the DTE database and DTRI cover wide-varying types of digital policy measures that are categorised in different chapters and subchapters, an unweighted approach would run the risk of having a final index outcome that is subject to the arbitrary importance of each measure relative to one another. To circumvent this problem, the DTRI is therefore grouped into different chapters and subchapters by applying appropriate weights.

For these reasons, a weighted approach across the measures, chapters, and subchapters has been preferred. Note, however, that the final stage of the index is ultimately a simple unweighted average of the four clusters. The reason for doing so relates to the fact that while it is possible to compare the trade restrictiveness of measures within the same chapter (e.g. measures related to Data Policies) and chapters within a certain cluster (e.g. comparing Data Policies, Content Access, and Intermediary Liability), it is not as straightforward to compare different clusters (i.e. Establishment Restrictions and Fiscal Restrictions). This is also because there is a lack of any data on the relative importance of trade flows that are covered by the four clusters as they identify different modes of tradability.

Nonetheless, as a robustness check, two alternative unweighted approaches have been explored: one that takes an unweighted average of the measures within each chapter and subchapter, plus clusters (i.e. unweighted (1)), and one that applies an unweighted average across all measures of the index directly (i.e. unweighted (2)). Doing so does not alter the final index results in any substantial way, as the former shows a correlation of 0.95 with the weighted index approach whilst the latter a correlation of 0.96, as can be seen in Table C1. Both unweighted approaches also reveal a similar ranking of most and least restrictive countries.[26]

**Table C1**: Correlation Between Weighted and Unweighted DTRIs

| | Unweighted (1) | Unweighted (2) | Weighted |
|---|---|---|---|
| Unweighted (1) | 1 | | |
| Unweighted (2) | 0.95 | 1 | |
| Weighted | 0.96 | 0.96 | 1 |

[26] Both results can be obtained upon request.

## Annex D: European Union and Member States

Since the EU is composed of shared as well as non-shared competences among its member states, some measures in the DTE database belong to individual EU member countries while others are set at the EU level.

This mix of shared and non-shared policies is also reflected in our DTE database and DTRI index. That means that in cases where the EU has an exclusive competence, which means that EU member states have delegated policy competence at European level, the measures are set for each member state equally and counted as such in the index. The most straightforward example is the policies covered under Chapter 1 of Tariffs and Trade Defense, which apply to all EU member states in a similar way.

In cases where the EU member states have not delegated policy competence at the European level and, therefore, have retained their policy competence at the national level, the measures are set for each member state separately. For instance, this is the case for investment policies covered under Chapter 4. In these cases, our index for the EU takes all these separate policy measures for each member state into account by calculating a simple average.

Furthermore, in some cases, despite an overall EU framework, member states have transposed such framework in their national legislation in different ways. This is often the case when there is a Directive regulating a certain issue. One example is the case of copyright. In these instances, we assigned different scores to member states and the EU index is also obtained with a simple average of the scores in different EU countries.

Finally, there are also few cases in which the EU has undertaken certain policies on its own and member states also have the option to impose these policies nationally. This is the case, for example, with injunctions for patent infringement. In these cases, the EU obtains a score based on its own regime, without taking into account the score of member states which receive a score that reflects their national policies only.

## Annex E: Country Codes and Names

| ISO-3 digit code | Country |
|---|---|
| ARG | Argentina |
| AUS | Australia |
| AUT | Austria |
| BEL | Belgium |
| BGR | Bulgaria |
| BRA | Brazil |
| BRN | Brunei |
| CAN | Canada |
| CHE | Switzerland |
| CHL | Chile |
| CHN | China |
| COL | Colombia |
| CRI | Costa-Rica |
| CYP | Cyprus |
| CZE | Czech Republic |
| DEU | Germany |
| DNK | Denmark |
| ECU | Ecuador |
| ESP | Spain |
| EST | Estonia |
| EUR | European Union |
| FIN | Finland |
| FRA | France |
| GBR | United Kingdom |
| GRC | Greece |
| HKG | Hong-Kong |
| HRV | Croatia |
| HUN | Hungary |
| IDN | Indonesia |
| IND | India |
| IRL | Ireland |
| ISL | Iceland |
| ISR | Israel |

| ISO-3 digit code | Country |
|---|---|
| ITA | Italy |
| JPN | Japan |
| KOR | South Korea |
| LTU | Lithuania |
| LUX | Luxembourg |
| LVA | Latvia |
| MEX | Mexico |
| MLT | Malta |
| MYS | Malaysia |
| NGA | Nigeria |
| NLD | Netherlands |
| NOR | Norway |
| NZL | New Zealand |
| PAK | Pakistan |
| PAN | Panama |
| PER | Peru |
| PHL | The Philippines |
| POL | Poland |
| PRT | Portugal |
| PRY | Paraguay |
| ROU | Romania |
| RUS | Russia |
| SGP | Singapore |
| SVK | Slovakia |
| SVN | Slovenia |
| SWE | Sweden |
| THA | Thailand |
| TUR | Turkey |
| TWN | Taiwan |
| USA | United States |
| VNM | Vietnam |
| ZAF | South Africa |

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