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How do we prepare for the technology-induced reshaping of trade?

This section examines how international trade cooperation can help governments all over the world harness digital technologies and seize the new trading opportunities they will create for firms both large and small. Section D.1 summarizes the main opportunities and challenges that arise with the expansion of digital trade. Section D.2 provides examples of the policies that governments put in place to exploit these opportunities and to address these challenges. Section D.3 then considers whether and how international cooperation can help governments exploit the gains from digital trade, cope with the challenges and at the same time achieve their public policy objectives, now and in the future.



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Some key facts and findings

- Digital technologies give rise to opportunities and challenges that may require the consideration of governments and the international community in areas as diverse as investment in digital infrastructure and human capital, trade policy measures and regulation.
- Provisions referring explicitly to digital technologies have been included in an increasing number of regional trade agreements. The most common provisions refer to e-government, co-operation and the moratorium on customs duties on electronic transmissions.
- While the WTO framework, and in particular the General Agreement on Trade in Services, is relevant for digital trade and WTO members have already taken certain steps to promote digital trade within the existing framework, members will have to consider how they want to respond to continued changes in the economy and the way we do business.



1. Main opportunities and challenges

The discussion of domestic policies and of existing international regulation and other forms of cooperation in this section refers back to the challenges and opportunities raised by digital trade in general (as covered in Section C) rather than by specific technologies (the Internet of Things (IoT), artificial intelligence (AI), etc.). It is organized along the broad categories of trade regulation (i.e. goods, services, intellectual property), as existing trade regulation typically does not refer to specific innovations or technologies.

Sections B and C discussed how digital technologies create new markets, modify forms of trade and encourage the emergence of new products, and how they lower trade costs and change trade patterns. These changes and in particular the lowering of trade costs offer new opportunities to trade and to gain from trade, and governments have a role to play in ensuring that firms can seize these opportunities.

First of all, the impact of digital innovation and of digital technologies on trade depends on access to digital infrastructure and a workforce with appropriate digital skills as well as on the availability of efficient and low-cost digital infrastructure services. Governments can invest or encourage investment in digital infrastructure and digital skills, and can contribute to the development of digital infrastructure services. Second, governments can also take measures to allow digital technologies to lower trade costs, for instance by enabling the faster and more reliable management of data across borders through the interoperability of data exchange systems and harmonization of e-certificates. They can use digital technologies to facilitate trade operations and customs cooperation. They can also choose to take measures (such as *de minimis* provisions, i.e. the value under which shipments and parcels can be imported duty-free through simplified customs procedures) when digital trade raises challenges for customs administrations, such as those related to the increase in the number of small parcels being sent by post or courier as a result of the growing number of purchases made online. At the same time, however, the reduction of trade costs will, in principle, lower the price of imported products relative to that of domestic products, possibly generating protectionist pressure from domestic producers subject to import competition.

Digital technologies raise concerns relating to loss of privacy, consumer protection or security threats as was discussed in Section B. This chapter discusses how, in the context of digital trade, governments

need to develop a domestic regulatory framework to achieve a number of legitimate public policy objectives such as consumer protection, cybersecurity and data privacy in ways that are not more trade-distorting than necessary.

Section C examined how digital technologies may modify comparative advantage, for instance by making it possible for firms in remote least-developed countries (LDCs) to sell and supply by digital means products around the whole world or by making it profitable for firms in high-income countries to reshore certain activities. This raises new development opportunities and challenges. An important dimension of this issue is the digital divide between richer and poorer economies, raising the question of how smaller, poorer countries may seize the new trading opportunities.

Section B examined how digital trade may involve a winner-takes-all environment and raise market dominance issues (product competition becoming fiercer, the rise of platforms creating monopoly positions) while section C explained how digital technologies create new opportunities for small firms to participate in trade. For governments, important questions that arise are whether the new competition dynamics raise policy questions that they must address and whether there is a role for them in helping small firms seize the new opportunities.

2. How do governments respond?

This subsection examines how governments respond to the opportunities and challenges raised by digital innovation and discusses some of the issues that may arise if they fail to coordinate their responses and instead act non-cooperatively.

In order to realise fully the potential benefits of digital trade, most governments have adopted digital development strategies which involve cross-cutting policy measures aimed at improving infrastructure, establishing an adequate regulatory framework, reducing the cost of doing business and facilitating relevant skills development. Such measures consist of interventions such as investing in relevant infrastructure or improving the business environment to encourage private investment in information and communications technology (ICT) infrastructure; establishing a regulatory environment which is favourable to digital development but which also ensures adequate levels of cybersecurity, consumer protection or data privacy; using both merchandise and services trade policies to promote the digital economy and to improve their competitiveness; and using competition and micro, small and medium-sized

enterprise (MSME) policies to level the playing field for firms and to address the new “winner takes all” dynamics described in Section B.

Governments may choose different priorities among these policy measures, depending on their level of development and the extent of digitalization within their economies, with developing economies typically focusing on facilitating connectivity and adopting digital technologies, while developed economies pay relatively greater attention to regulatory issues related to competition, data protection and consumer protection. Skills development and the promotion of MSMEs’ involvement in digital trade seem to be common concerns for both developing and developed economies. In a number of areas, the unilateral responses of governments to changes in trade induced by digital technologies seem to generate negative spillovers for their trading partners, or simply higher trading costs than if they were coordinated. In those areas, there may be scope for more international cooperation than is already in place.

(a) Investment in infrastructure and human capital

As highlighted in Section C, one of the key prerequisites for reaping gains from digital trade is the availability of adequate infrastructure, physical as well as digital. The need for investment in infrastructure is more acute in developing countries, as they tend to lag behind developed economies in terms of the pace of digital innovation and the level of infrastructure required to facilitate the adoption and effective use of digital technologies.

According to a United Nations Conference on Trade and Development (UNCTAD) digital strategies survey, which focused on two specific digital development objectives, namely broadband infrastructure development and digital business development, out of the 102 strategies surveyed, 91 (of which 64 from developing and transition economies) were found to include digital infrastructure objectives (UNCTAD, 2017e). While most of the digital strategies do not provide details on investment requirements, they do acknowledge potential sources of funding for digital development, with public funding being the primary source of finance, followed by private sector investment and public-private partnerships respectively. UNCTAD (2017e) also examines the various other policy tools used by governments to promote and facilitate investment in broadband infrastructure or the digital industry, finding that the focus seems to be on improving the enabling (sectoral) regulatory framework. Other measures include investment incentives, investment facilitation,

digital standards, and clusters and incubators for digital business development. Governments also invest in other infrastructure areas (such as electricity supply, trade logistics, delivery, tracking and payment systems) which complement the digital infrastructure.

In addition to the provision of reliable internet services and widespread mobile phone penetration, the availability of affordable payment solutions is crucial for businesses as well as for consumers to engage in commercial transactions online. To enable the growth of e-commerce, many developing countries, such as Bangladesh, India, Kenya and Tanzania, are promoting the shift towards electronic payments by investing in mobile phone-based payment solutions to facilitate money transfers and microfinancing services. In Thailand, in order to fuel e-commerce, a government-sponsored e-payment system called PromptPay, that creates a peer-to-peer payments system and involves all major Thai banks, has been launched. However, the availability of electronic payment systems alone is not enough to encourage digital trade. It is also important for governments to put in place an adequate regulatory framework to enhance the level of trust in online transactions among both businesses and consumers. Some examples of the government policies undertaken in this direction are discussed in the following subsection on “Domestic regulatory framework”.

Governments all over the world are using or promoting the use of digital technologies to facilitate trade by reducing delays in the clearance of goods at borders, thereby lowering associated costs (see Section C.1(b)). According to the World Bank’s “Doing Business: Trading Across Borders 2018” questionnaire, 175 of the 190 surveyed economies have electronic data interchange (EDI) systems already operational or in progress (World Bank, 2018). EDI systems facilitate the quick and reliable exchanges of paperless data and thus play a major role in speeding up the customs clearance procedure by allowing documents to be shared more easily between different authorities, thereby reducing the cargo dwell time. Furthermore, 117 out of the 190 surveyed economies have either already established or are in the process of putting in place an electronic single window system, i.e. a system which allows trade stakeholders to submit documentation and other information electronically through a single point of entry to complete customs procedures.

Developing countries such as China, India and Kenya are also investing in automation as a means of reducing dwell time and standardizing their port operations. At the same time, some economies, both developed (e.g. Belgium or the Netherlands) and

developing (e.g. the United Arab Emirates) are seeking to capitalize on more sophisticated digital innovations such as blockchain technology to streamline cargo flows and organize port logistics more efficiently. The ports of Antwerp and Singapore, for example, have already undertaken pilot projects to test blockchain solutions aimed at simplifying paperwork, lowering administration costs and limiting attempts at fraud. In developing economies, such measures directed towards improving port logistics are typically stated. However, in developed countries, there is greater involvement by the private sector, which may undertake such measures independently or in partnership with government authorities.

Most countries, including many LDCs, now rely on foreign direct investment (FDI) inflows to develop their digital networks. With a view to attracting foreign investment and spurring trade, and in particular digital trade, many governments are working towards improving their investment climate in digital infrastructure services (see Section D.2(b) on the role played by trade policies in this context). Over the past 25 years, regulation in the telecommunications sector has undergone fundamental transformations. According to the International Telecommunication Union (ITU), a majority of countries has moved from monopolies to regulatory environments that encourage effective competition, including foreign participation, with reduced barriers to entry and often privatized state-owned incumbents (ITU, 2016).

In the case of LDCs, inadequate ICT infrastructure services, coupled with the workforce's low levels of digital skills, is a major hindrance to realising the potential benefits of digital trade. In view of this, several LDCs, such as Haiti and Rwanda, are improving their investment climate by offering various incentives to foreign investors (e.g. tax holidays and exemptions, and reduced import duties).¹ With a similar aim of attracting FDI and encouraging digital trade, the Chinese government is currently focusing on the creation of more cross-border business-to-consumer (B2C) e-commerce comprehensive pilot zones, such as that in Hangzhou, to facilitate cross-border e-commerce flows, driven largely by domestic demand for foreign goods and MSME exports (The State Council Information Office of the People's Republic of China, 2017). These zones provide seamless cross-border logistics services, such as special customs facilities (including pilot work on single window declarations) and special arrangements for international payments and tax refunds.

In addition to the development of their digital infrastructure, many governments, in developing and developed countries alike, are undertaking substantial

investment in human capital through training and skills development to facilitate the effective uptake and usage of digital technologies. Various governments are offering adult learning programmes focusing on digital skills development and complex cognitive skills such as information processing and problem-solving. These efforts are often supported by local non-governmental organizations that offer training to marginalized groups such as the unemployed, women and the elderly, especially in the case of developing countries. (e.g. the ICT Academy in India and the Committee for Democracy in Information Technology in Mexico, Colombia and Brazil).²

In order to bridge the digital divide within countries, arising due to factors such as income disparity, age, gender and disabilities, many governments have undertaken initiatives to provide affordable access to ICT, specifically targeting disadvantaged groups such as women, the elderly, the disabled and people in rural/remote areas. Initiatives in Chile, India and Mexico, for example, typically offer grants and subsidies to facilitate access to ICT equipment, as well as digital literacy programmes and training in ICT skills (BBVA, 2018).³

Another key dimension of the digital divide is that of the divide between developing and developed countries, in terms of access as well as effective usage of digital technologies. Bridging the digital divide between poor and rich countries would contribute to the convergence of "digitally advanced" economies and "digitally lagging" economies and help to realize fully the potential of ICT as an engine of socio-economic development.

Building on unilateral efforts, international cooperation has a major role to play in this context. First, as discussed in Section D.3, international cooperation, in particular in the context of the WTO, can help governments to adopt more open trade and investment policies in the ICT sector which, if supported by an adequate regulatory framework, could help them to attract FDI, develop their digital infrastructure, and bridge the digital divide between poor and rich economies (see Box D.1). Second, cooperation, in terms of technical assistance and capacity-building efforts undertaken by developed and richer developing countries and international organizations, can help to facilitate digitalization in developing countries.

(b) Trade policy measures

(i) Services

As already mentioned in Section C.1(e) and as explained in more detail in Box D.1., trade and

Box D.1: The effect of services trade policies on the digital economy

According to Roy (2017), existing research suggests that policies which limit services trade, for example by restricting market entry and foreign investment in services markets, or by impeding online cross-border supply, constrain the development of the digital economy. Generally, services trade costs are significantly higher than those of the goods trade, and services sectors with lower trade costs, themselves associated with lower barriers to services trade, tend to be more productive and to experience higher productivity growth than those with higher trade costs (Miroudot and Shepherd, 2016; Miroudot et al., 2012). This carries implications for ICT services and their ability to foster more inclusive trade.

There also appears to be a negative correlation between entry barriers and regulatory restrictiveness in services, on the one hand, and investments in digital technologies and ICT on the other (World Bank, 2016). This suggests that barriers to entry and competition in service sectors reduce the incentive of suppliers to invest in digital technologies (e.g. the use of cloud facilities by transport companies, the supply of online services by professional services firms, or use of the internet by retailers).

Barriers to trade in services may also shield domestic suppliers from competition, leading to higher prices and reduced incentives to invest, innovate, or otherwise improve services quality. Indeed, services trade restrictions, are negatively associated with performance in a number of important services sectors, as measured by comparable indicators across a broad range of countries (Nordås and Rouzet, 2016; Borchert et al., 2017).

Recent research also evidences the negative impact of services trade restrictions on foreign investment inflows into service sectors. Countries with lower restrictiveness are significantly more likely to attract foreign investment in services than countries with more trade-restrictive regulatory frameworks (OECD, 2017f). Furthermore, restrictions not only limit new investments, but also are associated with lower sales by foreign affiliates already established in the host country. Aside from affecting foreign suppliers, regulatory restrictions also discourage small domestic firms and newer firms from competing in the market, with implications for innovation and job creation. This dissuading effect can limit investments in new technologies and network infrastructure, and restrain expansion in productive capacity, as well as curbing competition and limiting the availability of quality low-cost services. This, in turn, has implications for connectivity and trade through its impact on digital infrastructure services.

Restrictiveness in the services trade limits not only imports but also exports of services from the country imposing the measures (Nordås and Rouzet, 2016). This may be because, by limiting competition, restrictions negatively affect the performance of domestic suppliers, reducing incentives to improve efficiency through innovation, the adoption of new technologies and investment. This in turn affects the capacity of domestic suppliers to compete in international markets.

Services trade policies also play a key role in the development of the necessary backbone infrastructure, with resulting impacts on the economy as a whole. Over the past decades, governments have tended to adopt policies encouraging greater FDI and competition in the telecommunications sector. Many studies have found that these changes have been associated with enhanced affordability, as well as a higher quality and greater diversity of telecommunications services (Lestage et al., 2013).

As noted in ITU (2017), countries that have introduced quality regulation – including, in particular, regulation allowing competition – have had greater success than other countries in stirring up market growth and developing their digital economy. Positive regulatory settings are necessary to drive ICT investment, use and uptake. Bridging the digital divide, therefore, hinges largely on government policies.⁴ As reported by the UN Broadband Commission (2013), a study of 165 countries shows that between 2001 and 2012, mobile broadband penetration levels were 26.5 per cent higher in countries with competitive markets. Recent research (e.g. Nordås and Rouzet, 2016 and Borchert et al., 2017) has found that higher levels of services trade restrictiveness in telecommunications services are associated with lower penetration rates for fixed, mobile and broadband internet.

Box D.1: The effect of services trade policies on the digital economy (continued)

Open trade and investment policies in the telecommunications sector, supported by adequate regulatory frameworks, can therefore be seen as key building blocks for the development of quality infrastructure to help reduce the digital divide and take advantage of digital opportunities. Policies affecting foreign commercial presence may prove to be a particularly determinant factor. Studies have shown that markets characterized by more intense competition experience greater price decreases and improved services; others have linked telecommunications liberalization to higher gross domestic product (GDP) growth rates (Mattoo et al., 2006; Eschenbach and Hoekman, 2006), as well as higher productivity in firms in other sectors (Arnold et al., 2008; Balchin et al., 2016).

Prepared by the authors, based on Roy (2017).

services policies can affect the development and performance of both digital infrastructure services and digitally-enabled services, as well as the use and uptake of digital technologies more broadly (Roy, 2017). As such, they have an important role to play in complementing cross-sectoral investment facilitation and promotion measures. Trade policy does not only affect digital infrastructure services and digitally-enabled services; measures related to services sectors such as finance, distribution, logistics and transport are key determinants of the impact of digital technologies on the trade of goods. The role of digital platforms (distribution services intermediaries) in lowering trade costs, for instance, can only go so far in markets where uncompetitive transport services result in exorbitant transport costs. Efficient services markets, therefore, are a necessary pre-condition for reaping the benefits of digital technologies.

An examination of policy changes in services between 2000 and 2015 reveals a significant push towards greater liberalization, which has continued despite the economic crisis (Roy, 2015). While preferential trade agreements (PTAs) do sometimes lead to new liberalization, the preponderant share of such reforms likely occurs autonomously. Over this period, most policy changes related either to financial services or were cross-sectoral in nature. There were relatively few policy changes in telecommunications or audiovisual services. By contrast, the Organisation for Economic Co-operation and Development's (OECD) Services Trade Restrictiveness Index (OECD, 2018a) suggests that, over the period 2014 to 2017, the highest net liberalization has taken place in some of the sectors that form part of the digital network and the transport and logistics chain. For specific examples of services trade policy reforms in the telecommunications/ICT/audiovisual services sectors, see Annex 4 of WTO (2017c) and WTO (2018b).

Despite evidence of the benefits of open and non-discriminatory policies and the adverse effects of restrictive policy and regulation, trade restrictions are still maintained and erected by some governments to protect local industries, including digital platforms, from foreign competition and/or to foster the emergence of "national champions". Requirements for majority domestic equity ownership in ICT firms, minimum quotas for local employment, various forms of performance and/or local content requirements (not only with regard to the use of local services and/or service suppliers but also with regard to locally produced hardware components) are some examples.⁵ These policies restrict access for and the operation of foreign services suppliers, and they may also take a toll on the broader economy.

Indeed, most benefits arising from the digital economy – notably through innovation and productivity growth – come through the adoption of digital technologies, not necessarily from their creation. Local content requirements, for example, merely increase companies' costs, slowing down digital technology assimilation.⁶ The ICT services sector, which includes computer and related activities and telecommunications services, usually accounts only for 3 to 4 per cent of GDP, but the services it provides have a much larger impact, affecting productivity and efficiency in other sectors, such as retail, banking and even manufacturing.⁷ Interestingly, the OECD's Services Trade Restrictiveness Index (OECD, 2018a) suggests that in 2017, the largest overall increase in services restrictiveness at the sectoral level was seen in the telecommunications sector.

International cooperation in the WTO or regional agreements can help governments to open up and stimulate competition in their digital infrastructure services sectors which, when supported by an adequate regulatory framework, can make an important contribution to the development of quality digital infrastructure (see Section D.3).

(ii) Goods

As is the case with services, merchandise trade policies can have an impact on the development and performance of digital infrastructure and on the use and uptake of digital technologies more broadly. According to the WTO's Trade Monitoring Database, some countries, such as Argentina, Brazil and Switzerland, have reduced or entirely eliminated import tariffs on certain informatics and telecommunications equipment. India, on the other hand, notified a 10 per cent import duty increase on certain telecommunication equipment (see section 3.5 of WTO, 2017c).

Several governments have revised the *de minimis* threshold, and some governments have raised it, allowing more shipments and parcels, often shipped by individuals and small businesses engaging in cross-border e-commerce, to be imported hassle- and duty-free (see Box C.4 on e-commerce and the "parcellization" of trade). The United States, for example, raised its *de minimis* threshold from US\$ 200 to US\$ 800 in 2015. Other governments, however, have lowered their *de minimis* threshold.

The Global Trade Alert lists both "liberalizing" and "harmful" non-tariff measures affecting ICT-related sectors which have been adopted by governments in the last 10 years. In the computing machinery and parts sector for instance, around 100 harmful non-tariff measures were adopted, compared to 26 liberalizing measures. Among the most frequently used "harmful" measures are those that relate to trade finance and tax-based export incentives, while the most frequently observed liberalizing measures relate to the internal taxation of imports and import licensing requirements.⁸

As discussed in Section D.3, international cooperation in the WTO or regional agreements can help governments maintain or facilitate access to digital technologies and thereby help the development of quality infrastructure.

(c) Domestic regulatory framework

As already mentioned, governments typically improve the enabling regulatory framework to promote and facilitate investment in digital infrastructure or the digital industry. At the same time, however, they also introduce regulations which aim to achieve public policy objectives such as consumer protection, data privacy protection and cybersecurity. These regulations, like many other public policies, may affect trade in one way or another.

(i) Electronic authentication, contracts and signatures

In order to facilitate digital trade, many countries have taken steps towards building an adequate legal framework that regulates electronic transactions and, in particular, establishes the standards for the validity of electronic contracts and signatures. Legislations related to electronic authentication aim to promote the growth of e-commerce by recognizing the legal enforceability of electronic records and signatures and ensuring the security of electronic transactions. For example, the Philippines' Electronic Commerce Act of 2000, based on the UNCITRAL Model Law on Electronic Commerce of 1996, stipulates that no electronic document or message shall be denied legal effect because it is in electronic form. The Act does not discriminate between different types of technology, and covers electronic data messages and documents created for both commercial as well as non-commercial purposes (Galaxia, 2013).

It is noteworthy that over 71 states have adopted legislation based on or influenced by the UNCITRAL Model Law on Electronic Commerce (UNCITRAL, 2018). However, there is still scope for international cooperation in this area to harmonize e-signatures originating under different jurisdictions and, in turn, facilitate smooth cross-border flows of digital trade.

(ii) Consumer protection

The presence of a robust legal framework for consumer protection fosters consumer confidence and enhances trust in digital markets and online transactions, thereby making it easier for them to engage in cross-border flows of e-commerce. According to UNCTAD's Global Cyberlaw Tracker, out of the 125 countries for which data exists, 97 (of which 61 are developing or transition economies) have adopted consumer protection legislation related to e-commerce (UNCTAD, 2018b). The existence of consumer protection laws is particularly low in Africa, with only 23 out of 54 countries having legislation in place.

Most of the existing legislations related to consumer protection aim to protect consumers from fraudulent and deceptive commercial activities online and to safeguard consumers against misleading online advertising. For example, Viet Nam's Law on Protection of Consumers' Rights (McCaig and Pavcnik, 2017; Vietnam Law Official Gazette, 2011) safeguards consumers engaging in electronic transactions by prohibiting suppliers from sharing misleading, deceitful and incomplete information related to their goods and/or services. Under

this law, consumers also have the right to resolve disputes via negotiation, mediation or arbitration, or in court. Colombia's general consumer protection law (Congreso de la República de Colombia, 2011) has a special provision for e-commerce and offers the buyer the right to withdraw a purchase within five days of the transaction. It also safeguards consumers against abusive clauses in membership contracts.

A number of countries have adopted legislation to protect consumers from unsolicited commercial electronic messages, commonly known as "spam". Considering spam to be an invasion of privacy, the Federal Government of Australia passed the Spam Act 2003 which states that sending a commercial electronic message would constitute a breach of the Act, unless the recipient has provided "express or inferred consent" (Bartier Perry Lawyers, 2004).

Since countries develop their consumer protection legislations independently at the national level, applicable law may often be an issue in case of cross-border e-commerce. There may be a role for international cooperation in developing a common understanding of consumer protection with a view to reducing the cost to exporters of having to adapt to multiple different national laws, and specifically, to address jurisdictional issues that may arise in the case of a dispute or conflict regarding cross-border online transactions.

(iii) Data privacy protection

According to UNCTAD's Global Cyberlaw Tracker, 107 countries (of which 66 were developing or transition economies) have introduced legislation to ensure the protection of data and privacy (UNCTAD, 2018b). These legislations may differ significantly between countries because of differences in countries' preferences. Even though underlying privacy principles may be relatively similar across countries, interpretations and applications in specific jurisdictions differ significantly. In some countries privacy is protected as a fundamental right, while in other countries, the protection of individual privacy is based on other constitutional doctrines or in tort. Other countries have not yet adopted privacy protections. Such differences will increasingly affect individuals, businesses and international trade (UNCTAD, 2016a).

The new General Data Protection Regulation (GDPR), which entered into force in the European Union on 25 May 2018, is the most important change in European data privacy regulation in 20 years (see Box D.2). Malaysia, Singapore and South Africa are some of the other countries that have adopted data

protection legislation most recently, with each of them resulting in the establishment of an independent national data protection regulator. Australia, Canada, Japan, New Zealand, Poland and Russia have been some of the most recent countries to amend their existing laws related to data protection, and their amendments focused on the removal of exemptions, the centralization of data protection regulation in a single national agency, and the expansion of data protection requirements to include matters related to security (UNCTAD, 2016a).

Many data protection laws contain significant gaps and exemptions. For instance, exemptions might apply to small businesses (in the cases of Australia and Canada) or to small datasets (in the case of Japan). Some data protection laws may apply only to specific sectors such as health and credit, whereas other laws may include exemptions based on the subject (for example, data concerning children versus employee data) and the source of the data (for example, data collected online versus offline). The existence of these gaps and exemptions in different data protection regimes poses a challenge for their interoperability across countries (UNCTAD, 2016a).

Lack of data protection legislation can reduce trust and confidence in a wide range of commercial activities. As for exemptions, they create several problems from a trade perspective. They require a wide range of stakeholders (business, trading partners, consumers and regulators) to identify and categorize data in complex ways. They severely limit opportunities for countries to meet an "adequacy test" for cross-border transfers. Finally, they can lead to complex complaints and disputes over coverage. It is worth noting, however, that data protection regimes need not be identical in order for them to be interoperable; it is possible for data protection regimes to achieve shared goals through different mechanisms.

Also, as discussed by Avi Goldfarb and Dan Trefler, Rotman School of Management, University of Toronto (see their opinion piece on page 140), there may be a need for international cooperation on data privacy protection aimed at avoiding a race to the bottom, i.e. a situation where governments deregulate their business environment (or reduce tax rates), in order to attract or retain economic activity in their jurisdictions (see also Goldfarb and Trefler, 2018a). In theory, restrictive data privacy policies can restrict the use of such technologies for a given level of data, but they can also increase the supply of available data if it leads consumers to trust firms that collect data. In practice, however, the first effect seems to dominate, and less restrictive data privacy protection policies

Box D.2: The European Union's General Data Protection Regulation

The European Union's General Data Protection Regulation (GDPR), which unifies data privacy protection regulations across the European Union, came into force in May 2018. The provisions of the GDPR are consistent across all 28 EU member states and apply to all businesses processing the personal data of data subjects residing in the European Union, irrespective of where the business is based. In particular, the GDPR is applicable to the processing of personal data by both "controllers" and "processors", wherein a "controller" is the entity that determines the purposes, conditions and means of the processing of personal data, while the "processor" is an entity which processes personal data on behalf of the controller. Under the GDPR, personal data is defined as any information that may be used directly or indirectly to identify an individual. It may refer to a name, a photo, an email address, bank details, posts on social networking platforms, medical information or a computer IP address.

The GDPR requires data protection by design and by default. Data protection by design means that data controllers must put in place technical and organizational measures (such as the use of pseudonyms) to minimize personal data processing. Data protection by default means that data controllers must put in place appropriate measures to ensure that, by default, they process only those personal data which are necessary for each specific purpose of the processing. This obligation applies to the amount of personal data collected, the extent of their processing, the period of their storage and their accessibility. With the aim of improving data transparency and empowering the data subjects, the GDPR also requires the controller to provide a copy of the personal data to the data subject, free of charge, in an electronic format. The GDPR also introduces "data portability" as the right of a data subject to transmit the data to another controller.

Non-compliance with the provisions of the GDPR may result in fines of up to 4 per cent of a business's annual global turnover, or EUR 20 million. This is the highest penalty that can be imposed on a business for not having sufficient customer consent to process data or for violating the requirement of data protection by design.

Prepared by the authors, based on EU GDPR (2018).

seem to benefit firms that use digital technologies (Goldfarb and Tucker, 2012). As already mentioned in Section C.2, the fact that lax privacy policies can confer an advantage on domestic digital industries relative to digital industries in countries with stricter policies suggests that there is potential for a race to the bottom in privacy policy. Goldfarb and Treffer (2018a) point out that this is at odds with the fact that in recent trade negotiations, the underlying assumption has been that privacy regulation is disguised protection. In their view, discussions should start with the public policy goal of the social benefits of protecting the personal information of users of electronic commerce, before moving to any particular situation in which privacy regulation might really be disguised protection.

(iv) Cybersecurity

The growth in digital trade has raised issues related to cybersecurity, the act of protecting IT systems and their contents from cyberattacks. Cyberattacks in general are "deliberate attempts by unauthorised persons to access IT systems, usually with the goal of theft, disruption, damage or other unlawful actions" (Fischer, 2014). Cybersecurity measures are aimed at protecting countries against cyber threats while trying to promote the benefits of a cyber-enabled world.

According to the ITU's Global Cybersecurity Index (GCI) 2017, there is a huge range in cybersecurity commitment among the ITU's 193 member states. Of these 193 member states, 96 have only started to make commitments in cybersecurity; 77 have developed complex commitments and engage in cybersecurity programmes and initiatives; and 21 demonstrate high commitment according to the ITU's evaluation criteria (ITU, 2018a). Moreover, only 38 per cent of the surveyed economies have a published cybersecurity strategy and only 11 per cent have a dedicated standalone strategy, while another 12 per cent have a cybersecurity strategy under development. The French National Security Strategy (ANSSI, 2015) for example, is quite comprehensive in that it has multiple objectives such as:

"safeguarding fundamental interests of the State information systems; maintaining digital trust and protecting personal data; raising awareness about cybersecurity and facilitating training of cybersecurity specialists; developing a favourable environment for digitalization of businesses and promoting European digital strategic autonomy".

Cybersecurity strategies involve various types of policies which may have an impact on trade.

OPINION PIECE

How artificial intelligence impacts international trade⁹

By Avi Goldfarb and Dan Trefler, Rotman School of Management, University of Toronto

Artificial intelligence (AI) is an emerging new general-purpose technology that promises to increase productivity and improve well-being. Within a generation, it will transform some of the largest categories of international trade in goods (e.g., autonomous vehicles) and international trade in services (e.g., financial services). Remarkably, AI technologies have already diffused to China, which is set to become an AI world leader in less than a generation. This is a development that has the potential to reconfigure world trade patterns.

Whether this potential is realized is an open question largely because regulatory frameworks surrounding AI will be major determinants of how AI-based products are traded. This is already apparent. Some of the largest US firms by market capitalization (Google, Facebook and Amazon) do not have access to the Chinese market due to regulation. Likewise, some of the largest Chinese firms by market capitalization (Tencent and Alibaba) may be excluded from the US market on the basis of national security concerns.

At the heart of these obstacles to AI-based trade is a fundamental regulatory tension. On the one hand, AI-based firms want a lax regulatory framework in their own country that allows them to harvest and deploy massive amounts of data. This creates a regulatory race to the bottom. (While it is theoretically possible that strict privacy regulation could create national advantage, the empirical evidence suggests a trade-off between privacy regulation and innovation). On the other hand, deployment often

requires industry standards which, if not coordinated internationally, will fragment world markets and drive demands for disguised protection by domestic players.

To illustrate these two forces, it is useful to consider them in the context of a specific policy. The most important of the many behind-the-border regulations that impact international comparative advantage in AI is privacy policy. Recent advances in AI have been driven by advances in machine learning. Machine learning is prediction technology in the statistical sense. It takes data and uses it to fill in missing information. In other words, a key input into today's AI is data. Companies with access to more data will be able to create AI that makes better predictions. More data mean better products.

By restricting the acquisition and use of data, privacy regulation hampers AI-driven innovation. Where this regulation is relatively strict, companies have struggled to use data in innovative and productive ways. Where this regulation is relatively permissive, companies have been able to develop remarkable new platform technologies with multiple apps, each generating data that enhances the predictive power of all apps on the platform. For example, Tencent is experimenting with credit scoring that uses data such as individuals' purchasing data, gaming behaviour and social media contacts to develop a credit score. Such credit scoring would likely violate US anti-discrimination laws and EU transparency rules (the General Data Protection Regulation or GDPR). This is just one of dozens of examples of

how AI-based products offered in one country may violate the laws of another.

This poses several challenges for the WTO. The WTO may be called upon to rule on whether domestic regulations are disguised protection. For example, are "algorithmic transparency" requirements that prevent foreign autonomous vehicles from operating in the domestic market a form of disguised protection, or a legitimate right of citizens who might be injured in an autonomous vehicle accident?

This example in turn points to the fact that the WTO may have to expand its role in fostering cooperation in the area of regulation. The domestic regulation of AI may lead to a regulatory race to the bottom, as it has been argued in areas such as environmental and labour policy. Trade agreements may have a role to play in encouraging cooperation on minimum privacy standards.

In summary, AI will generate transformative products and services that alter world trade patterns. This makes it essential to understand how behind-the-border regulatory and industrial policies affect comparative advantage in AI-based products.

Governments have a strong interest in securing their own IT systems and many have proposed security standards or requirements for their purchasing systems. In some cases, all foreign participation in government systems is prohibited. In others, components from a single country are explicitly forbidden. Some governments also see a state interest in ensuring that the IT systems used by their citizens are secure, in particular in their critical infrastructure. They may encourage or require domestic IT operators to better protect their systems through national security standards. Even in cases where they do not impose such national security standards, governments may have an interest in verifying that the IT products sold on their home market are secure. This would involve testing and certification which can be costly, in particular when processes differ between countries. Finally, several countries see security risks in the use of encryption systems and may require a specific certification process for cryptographic technology, or may even take more restrictive measures.

(v) Competition policy

Digitalization, while it can have important pro-competitive effects, can also bring with it exclusionary and/or collusive behaviours and restrictions to competition (see the discussion of market concentration effects in Section B.1). Digital innovation has resulted in the emergence of new “winner-takes-all” dynamics. In particular, the emergence of tech giants such as Amazon, Alibaba and Google raises important potential concerns about market dominance. Many governments and regulatory authorities are turning to competition policy to address perceived excesses of market power and/or to ensure a level playing field for smaller firms. For example, to prevent e-commerce giants from obstructing fair competition, China’s State Administration for Industry and Commerce (SAIC) introduced a regulation in October 2015 explicitly prohibiting e-commerce platforms from barring merchants from participating in promotions on other websites (CNBC, 2015).

France was the first country to pass a law setting a fixed price that retailers (foreign or domestic) may charge for an e-book published by national publishers.¹⁰ Amazon (the biggest online seller of books) responded by offering free shipping, in addition to the maximum allowed discount. Once more, threatened by digital competitors, traditional retailers and booksellers lobbied for an amendment to the original law, proposing a ban on the combination of free shipping and discount. This amendment, informally known as the “Anti-Amazon Law”, finally

came into effect in 2014, prohibiting shipping books for free. In return, Amazon fixed its delivery costs at EUR 0.01 per order (Blattberg, 2014), reflecting how the market reacts and adjusts.

It is also noteworthy that, very recently, Germany’s Monopolies Commission, in its July 2018 XXII Biennial Report (Monopolkommission, 2018), asserted that digital changes require corresponding legal adjustments, which in turn should be shaped both for the benefit of consumers and with fair rules for traditional and new suppliers. Particularly, the Monopolies Commission proposes: (1) to systematically investigate markets with algorithm-based pricing for adverse effects on competition; (2) to further harmonize the regulatory framework for audiovisual media services restricting the online services of public service broadcasters to socially and culturally relevant content; and (3) to reform the reimbursement system in the supply of medicines renouncing on a ban on mail-order sales of prescription medicines. This interest in the digital market is not something new. In an earlier Report, the Monopolies Commission (Monopolkommission, 2015) already touched upon the subject, specifically in relation to search engines, suggesting that it is possible for search engines to “make it more difficult for competing services to be found”. Furthermore, the Monopolies Commission noted that:

“Arbitrary non-inclusion in the web index, or the deletion of a website from it, could constitute abusive conduct on the part of a dominant search engine if inclusion in the index were to be technically possible and customary, and hence one company were to be treated differently than companies of the same kind”. (Bundesministerium der Justiz und für Verbraucherschutz, 2010).

Perceptions regarding possible anti-competitive effects associated with digital markets have also given rise to a number of very significant competition law enforcement cases in recent years, spanning a range of major jurisdictions. Several of these are summarized in Box D.3. In addition, various jurisdictions are addressing concerns related to anti-competitive outcomes in the digital economy in the competition advocacy activities of relevant agencies. Related longer-term “competition advocacy activities” that are being pursued in various jurisdictions are set out in Box D.4.

The OECD identifies the following characteristics as being intrinsic to competition law enforcement and competition advocacy in digital markets: (i) data as a primary competitive asset; (ii) privacy as an

Box D.3: Competition enforcement activities in digital markets

In the *Intel Corporation v European Commission* case, in 2017 the Court of Justice of the European Union reversed a ruling of the General Court, which had initially upheld the European Commission's EUR 1.06 billion fine for Intel's alleged abuse of its dominant position through a loyalty/exclusivity rebate scheme for its x86 central processing units (Giles and Modrall, 2017). Following this decision, such rebates, rather than being seen as restrictive of competition by object (the practice reveals in itself a sufficient degree of harm to competition), are now to be analysed under an effects-based approach (possibility of exempting the allegedly anti-competitive conduct because of efficiencies). The case has been remitted back to the General Court, where Intel will have a new chance to overturn the decision or achieve a significant reduction of the fine (Court of Justice of the European Union, 2007; De Muyter and Verheyden, 2017).

In the case of *Google Shopping* (European Commission, 2017a), the European Commission found in 2017 that:

“Google abused its market dominance as a search engine by promoting its own comparison shopping service in its search results, and demoting those of competitors [...]. It [thereby] denied other companies the chance to compete on the merits and to innovate. And most importantly, it denied European consumers a genuine choice of services and the full benefits of innovation”.

The European Commission, on this basis, imposed a fine of EUR 2.42 billion on Google (European Commission, 2017a). US commentary on the decision has emphasized how difficult it would be to bring a similar case in the United States, given the prevailing differences of competition law doctrine and evidentiary standards:

“Pursuing a US case against Google would be more complicated than in Europe, antitrust experts said, because of a higher standard of evidence needed to prove wrongdoing by the search giant. Rather than go to court, the Federal Trade Commission closed a similar investigation against Google in 2013 in exchange for Google's changing some of its business practices” (Washington Post, 2017).

The latest case is *Google/Android* (European Commission, 2018). In July 2018, the Commission fined Google EUR 4.34 billion for illegal practices after finding that the tech giant imposed illegal restrictions on Android device manufacturers and mobile network operators to cement its dominant position in general internet search. In particular, the Commission investigation found that Google had engaged in three separate types of practices: (1) illegal tying of Google's search and browser apps; (2) illegal payments conditional on exclusive pre-installation of Google Search; and (3) illegal obstruction of development and distribution of competing Android operating systems. At the time of the writing, Google had not filed an appeal.

Google also faced an antitrust ruling by the Federal Antimonopoly Services in the Russian Federation, which imposed a fine of RUB 438 million (about EUR 7.3 million) in 2017 (Federal Antimonopoly Service of the Russian Federation (FAS Russia), 2017a).

Prepared by the authors, based on Anderson et al. (2018a).

important component during the merger reviews; and (iii) the definition of the relevant market¹¹ and market power. As digital markets often involve nominally free products, a key competitive factor concerns control over data, and therefore a variety of competition law provisions may be relevant, including provisions relating to mergers, abuses of a dominant position and cartels (OECD, 2013).

In addition to the above-mentioned issues, collusive effects (facilitating inter-firm coordination of supply and pricing) can also arise in digital trade. Big

data analytics, in particular, can result in reactive algorithmic pricing that produces effects similar to explicit coordination (i.e., reduced outputs and higher prices) without an actual agreement to collude. In this regard, though, it is still not clear how far machine learning algorithms may facilitate the reaching of collusive outcomes. If market conditions are prone to collusion, it is likely that algorithms learning faster than humans would also be able through high-speed trial-and-error to eventually reach a cooperative equilibrium (OECD, 2017a). For example, the so-called tit-for-tat algorithm – a strategy that starts

Box D.4: Competition advocacy regarding digital markets by WTO members

A recent report by the Canadian Competition Bureau highlights that, although global developments in technology have allowed firms to harness data in ways that drive innovation and quality improvements across a range of industries, the use of big data, (i.e. very large data sets that may be analysed to reveal patterns, trends, and associations, especially relating to human behaviour and interactions) by firms may raise challenges related to competition law enforcement. The Competition Bureau, while adapting its tools and methods to this evolving area, will continue its investigations and analysis to be guided by fundamental competition law enforcement principles (The Canadian Competition Bureau, 2018).

The European Commission (2017d) has observed that certain practices may restrict competition by unduly limiting how products are distributed throughout the EU, potentially limiting consumer choice and preventing lower prices online. As noted by the Directorate-General for Competition, the inquiry's findings allow the Commission to target its enforcement of EU antitrust rules in e-commerce markets (European Commission's Directorate General for Competition, 2018). This is particularly relevant in the light of recent enforcement cases such as Google, Amazon and Facebook. For more details, see also European Commission (2017c; 2017e; 2017f).

The Japan Fair Trade Commission (2017) has referred to possible risks of competition being impeded and the interests of consumers being harmed as a result of concentration of big data in certain enterprises. While Japan's Competition Act is applicable to most competition concerns related to the collection and utilization of data, some issues such as "digital cartels" and monopolization and oligopolization of digital platforms still need to be addressed.

In the Russian Federation, a need has been identified to adapt antimonopoly regulation in order to address anti-competitive conduct on cross-border markets in the contexts of digitalization and globalization (President of the Russian Federation, 2017). The Federal Antimonopoly Service (FAS) has taken an important role in the development of new regulations to maintain competition. The primary focus has been on regulation of the inherent elements of modern digital markets, such as digital platforms, network effects and big data (Rudomino et al., 2018). These proposals are in line with FAS's recent enforcement activities in the Google case (Federal Antimonopoly Service of the Russian Federation, 2017b).

Prepared by the authors, based on Anderson et al. (2018b).

with cooperation but then will just copy exactly what the opponent did in the previous period – can often lead to cooperative behaviour. Although in terms of technology an AI sophisticated enough to take over business decisions arguably is not yet evident, competition law needs to keep a close eye on AI developments in order to be pro-active and prepared to address challenges ahead (Deng, 2018).

In sum, the successful operation of digital markets in the interest of consumers as well as producers seems very likely to entail significant activities on the part of national competition authorities. At the same time, the proliferation of cases and relevant policy initiatives carries the potential for coordination failures. The cross-border activities of digital firms can result in spillovers, for example in the case of varying stances across different jurisdictions towards anti-competitive agreements, abuses of dominant position and mergers (Epstein and Greve, 2004).

(d) Data localization

Data localization policies involve restrictions on the ability of firms to transmit data on domestic users to foreign countries. They may take the form of rules requiring data servers to be located within the country or data to be stored or processed in the country, prohibiting the collection or transfer of data without government approval and/or specifying government procurement preferences and technology standards that favour local companies. Such policies may be broad rules covering most or all types of data, or they may be focused on specific types of data. Narrower measures within this category include requirements for payments to be processed locally or requirements that personal information, such as medical or tax records, be stored within the country.

A report by the Albright Stonebridge Group (ASG, 2015) indicates that data localization requirements differ significantly between countries and that data

localization requirements are constantly changing. While some countries have laws that contain explicit data localization requirements, which require the entities that process data related to the country's citizens to have servers physically located within that country's borders, others have partial measures, including regulations applying only to certain domain names and regulations which require the consent of an individual before data about that individual can be transferred internationally, as well as mild restrictions, i.e. restrictions on international data transfers under certain conditions, and specific restrictions on the transfer of data in very specific sectors such as health and finance, on grounds of protecting citizens' sensitive data.

Policy-makers often justify data localization requirements on the basis of privacy or security concerns. Governments may argue that the data of their citizens need to be protected by the laws of the country where they live. They may also argue that data relating to domestic citizens should not be accessible to foreign national security agencies, and that foreign companies, when they use data, should be bound by the laws of the country where the data have been collected (Goldfarb and Trefler, 2018a). The argument that data localization requirements can be justified on privacy or cybersecurity grounds is subject to debate. Cory (2017), for example, argues that in most instances, data localization mandates increase neither commercial privacy nor data security. This is because most foreign companies doing business in a country have "legal nexus" which puts them in that country's jurisdiction. This means that they must comply with the host country's privacy and security laws and regulations on whether they store data in the host country, the home country or a third country. Cory also argues that the confidentiality of data does not generally depend on the country in which the data is stored, but rather on the measures used to store it securely.

Whether or not data localization is an appropriate means of addressing data privacy or security concerns is an important question, in large part because data localization requirements may impose a significant cost on foreign companies wanting to do business and may thereby impact trade. As discussed in Section C.2, data localization may force foreign companies who wish to collect data to establish commercial presence in all countries in which it is imposed. Foreign companies may also need to put in place a system that prevents data traffic from being routed internationally. As a consequence, they may have to spend more on IT and data storage services, than without data localization measures. They may be prevented from transferring data required for day-

to-day activities, such as for human resources, and may have to pay for duplicative services. And they may also be compelled to spend more on compliance activities, such as hiring a data protection officer, or putting in place systems to seek the approval of individuals or governments to transfer data. These additional costs can undermine a foreign firm's competitiveness by cutting into its profit margins (Cory, 2017). Depending on how they are designed and implemented, data localization requirements may also prevent some data storage or data processing services from being provided on a cross-border basis.

The economic literature that discusses the impact of data localization requirements on international trade and investment is scarce. Recent research by Ferracane and van der Marel (2018), however, suggests that data policies do indeed inhibit imports of services over the internet. These authors use an empirical approach to assess whether regulatory data policies implemented in 64 countries between 2006 and 2015 have had a significant impact on a country's ability to import services over the internet. More specifically, they develop and use a regulatory index of data policies that measures how restrictive countries are in regulating the usage and cross-border movement of data. This index of data policies is then related with trade in services over the internet to study whether indeed restrictive data policies reduce the imports of services over the internet.

(e) Intellectual property-related issues

Intellectual property (IP) protection, by determining the scope and extent of use-rights (i.e. licenses) to intangible content, provides much of the legal framework in which digital products are traded domestically and internationally (see Section C). As in many transactions the purchased product is never present in a physical form, but exists only in digital form on various devices, it is often the ownership and transfer of use-rights to this material that largely determines the commercial transaction when music, software and films are purchased and downloaded online. Some forms of services trade therefore consist of IP transactions, and in the case of many digital products purchased by consumers, the underlying IP license often defines the nature of the underlying commercial transaction. IP also facilitates various ways of trading in physical goods and in services using electronic means: for instance, the IP system enables the electronic flow of data and information necessary for e-commerce to function. In the intangible world of the internet, the significance of intellectual property rights (IPRs) such as trademarks to identify and market goods and services, and of

the copyright which covers the software running websites and apps, and of defining the use-rights (i.e. licenses) when music or movies are downloaded, has appreciably increased beyond the significant role IPRs already play in offline trade to channel and frame commercial information and proprietorship.

Advancements in communications technology have not only made digital content-sharing extremely easy, fast and cheap, they have also vastly increased the ability of private individuals to create digital content. While the facilitation of digital content-sharing has led to concerns about the rapid unauthorized distribution of films, music and other commercial content across the digital environment, the increased ability of private individuals to create digital content has given rise to business models such as YouTube, Google and Facebook, which rely on the exchange of such “user-generated content” on their platforms in order to attract third-party advertising.

In light of the multi-faceted interaction of the IP system with electronic commerce, governments’ IP-policy responses to these phenomena cover many different areas of intellectual property. One focus of government responses since the early days of the internet has been the successive adaptation of IP enforcement tools to the challenges of the online world. Following the adoption of the World Intellectual Property Organization (WIPO) Copyright Treaties in 1996 (see Section D.3(c)), a number of countries have introduced varying degrees of legal protection against the circumvention of technological protection measures (TPMs) or the removal of digital rights management (DRM) information. These measures created civil – and sometimes criminal – liability for the circumvention of technical measures (e.g. digital locks, passwords or encryption) that was used to control access to copyright-protected material on the internet, sometimes regardless of whether the use of the material would have constituted a copyright violation (see for example Ginsburg, 1999 and Hinze, 2006). Other systems further prohibited the manufacture and sale of tools that could be used for TPM circumvention (see for example Besek, 2003). The details of these regulations have a direct impact on software developers, and on the sale and distribution of digital downloads, such as in TPMs in video games (see for example Miller, 2007).

The practice of linking to and sharing content on the internet, which is at the root of the many trade opportunities offered by the internet, has also forced countries and jurisdictions to develop a more elaborate concept of “contributory infringement”, answering to whether, and under what circumstances, merely hyper-linking to infringing material, or

providing the possibility to search and locate infringing material on the internet, itself constituted IP infringement. Different policies have also been adopted as regards the extent to which the individual end-user and consumer of IP-protected material – as opposed to those actors producing it and making it available on the internet – should, in a departure from the traditional view, be held liable or even criminally responsible for IP infringement.

In order to further discourage illegal file-sharing, France in 2009 adopted the so called HADOPI Law (i.e. “Haute Autorité pour la diffusion des œuvres et la protection des droits sur Internet”, or “High Authority for the dissemination of works and the protection of rights on the internet”), which provides for a “graduated response”, i.e. a successive reduction – up to complete suspension – of internet access for users who have repeatedly been notified of online IP infringement. This type of enforcement system, used to different degrees also by Korea and New Zealand – which aims to discourage IP infringement by threatening the suspension of internet access of the end user through Internet Service Providers (ISPs), has sparked increased discussion about the appropriate balance of IP enforcement in the online world, and has had a profound impact on the designs of B2C business models (see for example Danaher et al., 2014 and Lucchi, 2011).

As many new online business models centre on novel ways to search, locate and present the vast amount of – mostly copyright-protected – content on the internet, countries have had to develop responses to the question of how the traditional exceptions and limitations to IP protection – which permit the appropriate balancing of the interests of IP users and rights-holders – are to be applied in the new digital world. This challenge has been to maintain the policy objective of IP regulation by transposing the existing legal concepts into the digital context, and to assess whether the existing balance between rights and obligations inherent in IP regulation conceived for the analogue world needed to be reviewed in light of the scale and nature of IP use in the digital world and the new business models it has triggered.

One example of these challenges is the issue of whether image search services, which display their search results as miniature versions or thumbnails of the images found on the internet, could benefit from existing exceptions to copyright protection, or whether image search engines require the authorization of each holder of image rights involved in the search (see McFarlane, 2007 and German Federal Court (BGH), 2017).

The Google Books Project – Google's initiative to scan entire libraries of books and provide full text searches of their content, displaying the results in “snippets” of relevant text, financed ultimately and partially through advertising (see also Box D.5) – and the ensuing large-scale litigation is an emblematic example of how IP regulation is often the essential determinant for the viability of such new business models that exist entirely in the digital space. Responses to these business models have highlighted that common law and civil law systems, and the different mechanisms of how these provide for copyright exceptions (i.e. specific permitted uses) or fair use (i.e. a doctrine permitting unauthorized uses under certain flexible factors), face very different challenges in accommodating such new business models (Hugenholtz and Senftleben, 2012).

An issue that is determinative for the viability of the many platform business models that rely on user-generated content is the liability of such platforms and of internet service providers (ISPs) in respect of the transmission and storage of material initiated by other parties by means of those platforms and ISPs. While this issue concerns any potentially illegal activities that may occur within the digital network environment, it has been much debated in the area of copyright and related rights. In the course of a normal process of transmission of protected content, a number of temporary reproductions of that content may be produced by service providers. These intermediaries may have only limited knowledge about the information they transmit or store, as well as limited ability to control or monitor such information.

The question that has arisen is to what extent service providers, who act as intermediaries transmitting or storing potentially infringing content, are or should be held liable for such content and, if so, what remedies should be available. The liability of intermediaries has now been addressed in various jurisdictions at the national level by limiting the liability of service providers, under specified conditions, to certain forms of injunctive relief in respect of certain IPR-infringing material or activities initiated by a person other than the service provider. In some of the varied systems employed by different WTO members, the conditions include that the service provider complies with a “notice and take down” procedure that allows the rights-holder to notify it of allegedly infringing material residing on its system and require it to take down or disable access to such material after receiving such notice. A certain form of “safe harbour” for cooperating service providers has also been reflected in recent international agreements (such as the IP Chapter of the Trans-Pacific Partnership Agreement (TPP)).

In the area of trademark protection, the relationship between trademarks and internet domain names has received particular attention. Some of the problems have derived from the fact that under each top-level domain (such as “.com”) there can be only one of each particular second-level domain name (e.g. “amazon.com”), which is usually allocated on a first-come, first-served basis within each top-level domain name. More recently, the introduction of new generic top-level domains that can consist of any string of letters, including brand names or geographical names, has further increased the focus on the interaction between registered trademarks and other distinctive signs (such as geographical indications), and the modalities of acquisition and use of domain names. These new top-level domains include names such as “.swiss”, “.patagonia” and “.wine”.

Specific problems also relate to the question of how terms that enjoy privileged status in the trademark system – such as names of international organizations under Article 6ter of the Paris Convention of 1967, incorporated into TRIPS by Article 9.1 – would be treated in the context of the domain name system administered by the Internet Corporation for Assigned Names and Numbers (ICANN). These names, such as “WTO” or “WIPO”, are not themselves trademarks, but are protected against unauthorized registration and use under international law.

A number of approaches have been developed to resolve these issues, including the WIPO Domain Name Processes and the adoption of the successful Uniform Domain Name Dispute Resolution Policy, and principles of taking into account trademark rights have been integrated into the allocation process for new generic top-level domains. However, various questions remain with respect to how the trademark standards and permissible exceptions interact with the essentially private allocation mechanism for the new generic top-level domains, as well as the second-level domains that can be created by their owners.

(f) MSMEs specific measures

The advent of the internet and of advanced digital technologies has made it easier for MSMEs to participate in trade and provided them with access to consumers in international markets. Taking note of the export potential of MSMEs, many governments are undertaking special efforts to increase the participation of MSMEs in digital trade.

For example, the Malaysian government, in partnership with the Alibaba Group and Malaysia Digital Economy Corporation (MDEC), has launched

Box D.5: The Google Books Project

Google operates Google Books, a programme under which Google scans and copies millions of books from participating libraries into an online database. Google Books houses both in-print and out-of-print books. Approximately 93 per cent of the books in the database are non-fiction, while only 7 per cent are fiction.

Two digital book programmes make up Google Books: the Partner Program and the Library Project. The Partner Program contains material provided to Google by book publishers or other rights-holders. The Library Project hosts scanned copies of books that Google borrows from collections of the New York Public Library, the Library of Congress and a number of university libraries. Google never sought the permission of the copyright-holders to copy or display the books used in the Library Project. After scanning a book into the Library Project, Google retains a copy for its own records and gives a digital copy to the participating library from which it borrowed the book. Google maintains an overall index of all the scanned books, and users can conduct searches using their own queries, to which Google returns a list of the most relevant books in which users' search terms appear. The user clicks on a particular result, whereupon Google directs the user to an "About the Book" page, which includes links to sellers of the book or libraries that list the book as part of their collections.

During searches, users can look at "snippet views" of selected books. Each snippet view comprises one-eighth of a page of the book. Google takes security measures to prevent users from viewing a complete copy of a snippet-view book by "blacklisting" certain pages in each book. An "attacker" that tries to obtain an entire digital copy of a book by stringing together words appearing in successive passages would obtain, at best, a patchwork of snippets; at least one snippet would be missing from every page, and 10 per cent of the pages would be missing.

In the ensuing court US case, *Authors Guild, Inc. v. Google Inc.* (United States District Court, 2013), in which author's associations and publishers challenged the project for copyright infringement, the court began its analysis by pointing out five notable benefits of Google Books. First, Google Books provides a new way for people to locate books and serves as a beneficial research tool for librarians. Second, Google Books promotes "data mining", permitting humanities scholars to analyse massive amounts of data quickly. Third, Google Books increases access to books by providing literature in a format compatible with various types of software and devices used by print-disabled individuals to read and locate books. Fourth, Google Books preserves old books, many of which are out of print or in a deteriorating condition. Finally, Google Books benefits authors and publishers by exposing users to books to which they might not otherwise be exposed and directing readers to shops that sell the books, thereby generating new audiences and profits.

The court then evaluated Google's defence by balancing the four fair use factors: (1) the purpose and character of the use, (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (4) the effect of the use on the potential market for the copyrighted work.

The court found the first factor, the purpose and character of the use, to weigh heavily in favour of fair use. The court determined that Google's use of the copyrighted books is highly transformative. Google Books transforms expressive text into a comprehensive word index, which helps readers, scholars, and researchers find books and opens new fields of research. Further, the court found that Google Books does not replace actual books because it is not a tool for reading books. Instead, it allows for the creation of "new information, new aesthetics, new insights and understandings". The court acknowledged that Google benefits commercially from Google Books because the programme draws users to Google websites, but found the important educational purpose of the programme to outweigh its commercial nature.

The court also found that factor two, the nature of the work, weighed in favour of fair use, as the vast majority of the books in Google Books are non-fiction. Non-fiction books are typically afforded less copyright protection than other works due to their educational value.

Turning to the third factor, the amount and substantiality of the portion taken, the court found it slightly weighted against fair use, since Google scans entire books and copies expression *verbatim*.

Box D.5: The Google Books Project (continued)

The court found that the fourth factor, the effect of the use upon the potential market, weighed strongly in favour of fair use. Google does not sell the scanned books, and the scans do not replace the books. Libraries can only download copies of books they already own. Further, users cannot obtain enough snippet views of the books to comprise an entire book because Google blacklists certain pages and snippets, meaning readers must still purchase the copyrighted works to obtain full access.

The court found that Google Books does not serve as a market replacement, but rather enhances book sales to the benefit of the copyright-holders by acting like a traditional in-store book display.

Lastly, in its overall assessment, the court noted that Google Books provides significant public benefits and advances the progress of the arts and sciences while maintaining a respectful consideration of the authors' rights (United States District Court, 2013; Viveros, 2014).

Prepared by the authors, based on Viveros (2014).

the Digital Free Trade Zone, combining a physical zone and a virtual platform to connect MSMEs with potential export markets and facilitate cross-border e-commerce activities.

In another example, as a part of its budget for 2017, Singapore announced an elaborate programme called "SMEs Go Digital" that aims to facilitate the adoption of digital technologies by MSMEs. The programme offers specialist advice and consultancy services to help MSMEs with their digitalization requirements. In addition to promoting skills development and lifelong learning for employees, the programme also offers pre-approved digital solutions for MSMEs in the logistics and retail sectors.

Other governments, such as Brazil, Canada, Chile and Switzerland, are undertaking programmes to assist local MSMEs in tapping international markets, streamlining their business processes, developing digital marketing strategies and improving their e-customer services. Along the same lines, many governments, in addition to offering advisory services on e-marketplaces, are also facilitating training programmes tailored for MSMEs to help improve their online export capabilities.

3. Digital trade and international cooperation

This subsection will start with a discussion of the rationales for international cooperation in the context of digital trade. It will then examine how existing international trade agreements and international organizations active in the trade area help governments to seize the opportunities and address the challenges associated with digital trade. It will also review current discussions in the WTO

context on related issues. Finally, the section will discuss issues that have been identified by academic researchers or other experts.

(a) Standard rationales for international trade cooperation and their applicability to digital trade

The fundamental purpose of international trade agreements, according to the traditional theory, is to ensure that governments internalize the negative externalities they impose on their trading partners (see the opinion piece by Robert W. Staiger, Department of Economics, Dartmouth College, on page 150). In other words, the core insight here is that if countries are large enough to have some market power, they can manipulate their terms of trade (the relative price of exports and imports) in their favour by unilaterally imposing import tariffs (or non-tariff measures). If two large trading partners behave in a non-cooperative way, they may end up in a Prisoner's Dilemma i.e. a situation in which actions that are rational for each country individually leave them worse off collectively (Bagwell and Staiger, 2002). The internalization of such negative externalities through reciprocity and the principle of non-discrimination will resolve this Dilemma and result in a level of tariffs and market access that is efficient from a global perspective. Whereas the terms-of-trade theory is based on international negative externalities, another approach, the commitment theory approach, views the rationale of trade agreements in terms of a domestic externality. According to the commitment theory, the role of trade agreements is to provide an external commitment device so as to enable governments to enhance the credibility of their trade policies (WTO, 2012c).

A number of qualifications are in order. First, neither the terms-of-trade theory nor the commitment theory provides a satisfactory explanation of the role of international trade agreements in the area of services. For example, the existence of a mode of supply of services through a foreign commercial presence makes it difficult to apply the terms-of-trade theory and the flexibility provided for in the General Agreement on Trade in Services (GATS) casts doubt on the relevance of the commitment theory. Thus, alternative explanations for international trade agreements in the area of services have been advanced.¹² Second, the terms-of-trade rationale for trade agreements explains traditional trade agreements that provide for “shallow integration” through rules on tariff reductions coupled with rules to ensure that the value of tariff reductions is not undermined by non-tariff measures. However, provisions on non-tariff measures in international trade agreements often go beyond the need to avoid policy substitution between tariffs and non-tariff measures. This can be explained by various factors, including the differences between non-tariff measures and tariff measures, such as information problems, the role of private standards, the possible strategic competitive use of non-tariff measures and new forms of cross-border spillover effects resulting from the growth of global value chains (WTO, 2012c).

Negative international externalities may arise from factors other than terms-of-trade manipulation. In particular, regulatory heterogeneity may lead to significant trade costs. Thus, trade agreements can also serve to help governments reduce the costs that result when firms are required to comply with different regulatory requirements in different markets (Hoekman and Mavroidis, 2015). Yet another role that a trade agreement may be called upon to play is to prevent a race-to-the-bottom through a competitive lowering of regulatory standards (Sheldon, 2006; Bagwell and Staiger, 2002).

Digital trade measures may give rise to various types of negative externalities and thereby warrant international cooperation. First, where such measures favour domestic producers over foreign ones, the negative externality is similar to the terms-of-trade externality and the rationale for trade cooperation is to create a mechanism preventing governments from behaving opportunistically by compelling them to take into account the costs of their actions for foreign firms. Second, international cooperation may also be warranted where measures affecting digital trade produce negative externalities of a jurisdictional nature. Thus, for example, the cross-border dimension of digital firms can result in cross-jurisdictional spillovers in the domain of competition law and policy, as discussed in Section D.2. Third,

negative externalities can arise as a result of costs incurred because firms have had to comply with different regulatory requirements in different countries. In this respect, Section D.2 identifies several possible subjects for regulatory coordination, including electronic signatures, consumer protection, and data protection regimes. Finally, Section D.2 also discusses the need to avoid a race-to-the-bottom dynamic as a possible reason for international cooperation with respect to privacy protection.

Recent initiatives in the context of the trading system reflect these various rationales for international trade cooperation. There would appear to be an emerging recognition that adequate arrangements for trade by means of digital technologies must address a range of policy concerns in order to minimize the risks of negative externalities. In addition, the important role of foreign investment in the development of the digital economy means that the commitment theory mentioned above is particularly relevant in this context insofar as rules that lock in more open policies can help attract foreign investment, particularly in services enabling or supporting digital trade.

Finally, two observations can be made regarding the current international policy landscape regarding digital trade. First, over the last decade, digital trade has become an increasingly debated aspect of international trade relations. Economies are pursuing divergent policies in a context that some analysts have characterized as exhibiting features of strategic trade rivalry and in which market dominance of firms from certain countries has raised concerns. Tensions arising from differing economic policies have been exacerbated by differences in approach to the appropriate regulatory role of governments. While many analysts consider that there has been a rising trend towards “digital protectionism” or “digital trade barriers”,¹³ it has also been argued that measures alleged to constitute barriers to digital trade may often serve legitimate public policy objectives (Aaronson, 2016). These divergent policy and regulatory approaches can be seen as contributing to the more general phenomenon of what has been referred to as the “balkanization” or “fragmentation” of the internet (Drake et al., 2016; GCIG, 2016).¹⁴

Second, recent research on the rule-making challenges posed by digital trade discusses the need to address the interface between trade governance and various other policy objectives pursued by governments with respect to certain aspects of internet governance (Ashton-Hart, 2017; Ciuriak, 2018b; Ciuriak and Ptashkina, 2018b; Singh et al., 2016; Aaronson, 2016). One aspect of this may be how to bridge the intellectual, cultural and institutional

OPINION PIECE

On the implications of digital technologies for the multilateral trading system

By Robert W. Staiger, Department of Economics, Dartmouth College

There is little formal research into the implications of digital technologies for the multilateral trading system and the role of the WTO. However, the literature on the economics of trade agreements offers a possible approach to thinking about these issues. On the basis that trade agreements address the international externalities associated with unilateral trade policy decisions (see Bagwell and Staiger, 2016; Grossman, 2016), two questions might be asked: (1) How might digital technologies interact with the traditional international policy externalities addressed by the WTO; and/or (2) might they create new forms of international externalities that the WTO could address?

Consider the first question. In the literature on the economics of trade agreements, shifting a portion of the costs of unilateral trade policy interventions onto trading partners gives rise to a “terms-of-trade” externality. The market access issues that dominate WTO discussions can be reinterpreted within this literature as terms-of-trade-manipulation/international-cost-shifting issues (Bagwell and Staiger, 2002). The question can then be rephrased as whether digital technologies might alter the trade rules that are necessary to deal effectively with terms-of-trade manipulation.

There are many channels through which digital technologies could have such an effect (see, for example, the discussion in Gao, 2018). A basic issue in this context is how to classify digital trade for the purpose of applying existing WTO rules. For example, is a blueprint for use in a 3D printer, when delivered

from abroad, a traded good or a traded service? If the latter, should the transaction be considered as services trade under GATS Mode 1 or Mode 2?

Answering these questions is important, in part because of the different nature of the WTO approaches to liberalization in the GATT and in the GATS. While the GATT’s approach may be termed “shallow integration”, based on “tariffication” of protective measures and the subsequent focus of liberalization efforts on tariffs, the GATS’s approach can be characterized as “deep integration”, since it focuses on a variety of sector-specific behind-the-border regulatory measures. Will digital technologies, and the associated blurring of the goods/services distinction, make the distinction between GATT and GATS increasingly untenable? If so, the rising importance of digital technologies may necessitate a restructuring and unification of these agreements within the WTO.

Staiger and Sykes (2016) offer an interpretation of the distinct design features of the GATT and the GATS from the perspective of the terms-of-trade theory of trade agreements. They suggest that a redesign of the GATS in line with the shallow integration design of the GATT might be possible and could be warranted. Greater harmonization of the WTO approach to rules for trade in goods and in services could be even more beneficial in the light of the blurring of the distinction between trade in goods and trade in services.

Turning to the second question above, it is indeed possible that digital technologies will create new forms of international externalities that can be

addressed by the multilateral trading system. An example is the privacy issue associated with cross-border data flows. Just as firms’ intellectual property rights (IPRs) can have trade effects, protection of consumers’ data can also have trade impacts. Like IPR protection, cross-border privacy issues are not market access issues, i.e. the international externality associated with cross-border privacy issues does not take the form of a terms-of-trade externality. Accordingly, one would expect to look outside of the GATT and the GATS for solutions to the privacy issues raised by digital technologies.

The WTO TRIPS Agreement (i.e. the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights) seems a natural forum for addressing the privacy issues raised by digital technologies. Since much digital trade takes the form of licensing arrangements over intellectual property, issues of IPR protection are central to digital technologies. Moreover, the privacy issues raised by digital technologies can be viewed as cross-border private property rights issues over one’s own digital data. Viewed in this way, the international externality associated with these issues has a broadly similar structure to the non-market-access externality that the TRIPS Agreement is designed to address. (Rather than an agreement over reciprocal market access rights, TRIPS is an agreement on minimum standards for the protection and enforcement of IPRs, which are explicitly recognized in the TRIPS preamble as “private rights” – see Petersmann, 1996). This suggests that the broad design of TRIPS might also provide a platform for addressing the cross-border privacy issues raised by digital technologies.

gaps between the world of trade rules and other policy communities (UNCTAD, 2017a). Another theme that has been raised is how to strike the best balance between international rules to promote trade and ensure non-discrimination, and the pursuit of legitimate regulatory objectives of governments in areas such as online privacy and cybersecurity.¹⁵

(b) World Trade Organization

This subsection examines how certain WTO agreements cover digital trade, how they help economies to seize new trading opportunities arising from digital innovations, and how they address challenges. It also reviews discussions on related issues at the WTO.

(i) *Work programme and new initiatives on e-commerce*

Given the cross-cutting nature of e-commerce, the WTO Work Programme on Electronic Commerce adopted in 1998 tasked four WTO bodies (The Council for Trade in Services, the Council for Trade in Goods, the Council for TRIPS and the Committee for Trade and Development) to explore the relationship between existing WTO agreements and e-commerce. Since 1998, WTO ministerial conferences have considered the issue of e-commerce and decisions have been taken in that regard. In addition to agreeing to maintain the practice of not imposing customs duties on electronic transmissions, ministers have taken note of work done and have repeatedly called for the continuation and reinvigoration of the Work Programme on Electronic Commerce and for the General Council – the highest-level WTO body – to hold periodic reviews.

The period following the 10th WTO Ministerial Conference (which took place in Nairobi, Kenya, in December 2015) witnessed an increased interest among WTO members to deepen the discussion on e-commerce in the WTO. This increased momentum culminated in the circulation of ten submissions from members since July 2016. The submissions cover a wide range of issues including, among others, the definition of e-commerce, the applicability of customs duties to goods, transparency, the regulatory framework, and infrastructure gaps to enable e-commerce. Some members have shown a keen interest in pursuing e-commerce further, starting with looking at the existing WTO disciplines to determine what is currently addressed and what is not.

While discussions are still ongoing, the work programme has allowed consideration of how WTO

rules apply to e-commerce. Most of the discussions to date have moved toward the notion that electronic commerce falls within the scope of existing WTO agreements, even when there is no specific reference to “electronic commerce” or “online trade”. However, more recently, several members have been considering whether there is a need for new and improved multilateral rules, so as to respond to new challenges related to the changing nature of trade.

In the run up to the 11th WTO Ministerial Conference in Buenos Aires, Argentina, in 2017, 15 WTO members¹⁶ created an informal group called the “Friends of e-Commerce for Development” (FEDs) with the objective of raising awareness about how e-commerce could become a vehicle for development. The FEDs acknowledged e-commerce as a tool to drive growth, narrow the digital divide and generate digital solutions for developing countries and LDCs, and they agreed to develop a comprehensive, long-term digital trade policy agenda.¹⁷

At the Buenos Aires Ministerial Conference in December 2017, members agreed to continue the work under the Work Programme on Electronic Commerce (WTO, 1998). They also agreed to maintain the current practice of not imposing customs duties on electronic transmissions until 2019.¹⁸

At the same time, however, in an initiative distinct from the work programme, ministers representing 44 members (counting the European Union as one member) issued a joint statement on electronic commerce. In this statement, they reaffirm the importance of global economic commerce and the opportunities it creates for inclusive trade and development. They state that they share the goal of advancing electronic commerce work in the WTO in order to better harness these opportunities and announce that they, as a group, will initiate exploratory work together toward future WTO negotiations on trade-related aspects of electronic commerce (WTO, 2017b).

(ii) *Trade in services*

Trade agreements have a role to play in overcoming the negative externalities brought about by restrictive policies affecting digital trade in services. Because a number of services sectors provide the basic infrastructure for e-commerce (e.g., telecommunications, financial and distribution services) and since, in addition, a wide array of services is supplied electronically, the GATS appears particularly relevant.

Scope and obligations

The scope of application of the legal obligations in the GATS is extensive. The GATS applies to all measures affecting trade in services and “measures” are defined broadly to include “any measure by a Member, whether in the form of a law, regulation, rule, procedure, decision, administrative action or any other form”. The term “affecting” has been interpreted to cover not only measures which directly govern the supply of services but also measures which indirectly affect it.

The breadth of coverage of the GATS also results from the way in which the Agreement defines “trade in services”, as encompassing services supplied through four modes of supply.¹⁹ The four modes extend the definition of trade in services well beyond traditional notions of international trade. In addition, the term “supply” adds another important dimension, as it is also defined broadly, to include “the production, distribution, marketing, sale and delivery of a service”. Whereas merchandise trade under the General Agreement on Tariffs and Trade (GATT) only begins post-production, trade in services encompasses the production process throughout the value chain of services. Therefore, all government measures affecting the supply of services, from their production to the final delivery, are covered by GATS obligations. With regard to sectoral coverage, the GATS applies to all services sectors, with the exception of governmental services (referred to as services supplied in the exercise of governmental authority) and most of the air transport sector.

It is important to note that the GATS makes no distinctions regarding the different technological means through which a service may be supplied. Therefore, the supply of services through electronic means (for example, via the internet) is covered by the GATS in the same way as all other means of supply. This also means that GATS disciplines apply to services supplied electronically and that the supply of a service across borders includes all means of delivery, including electronic delivery. In other words, the GATS is “technology-neutral”. This has been confirmed by WTO jurisprudence (see Section D.3(b)(vii)). As a result, trade restrictions, as well as domestic regulations affecting electronic trade in services, are subject to the GATS.

All measures taken by governments with respect to the vast majority of the concerns usually identified in this context (e.g. network access, competition and interoperability, e-signatures, authentication, encryption, licensing, e-payments and standards, cybercrime, consumer protection, privacy of personal

data, and data flow restrictions), to the extent that they affect trade in services, are covered by the GATS.

The GATS legal framework contains two types of provisions: general obligations and specific commitments. Some general obligations apply across the board to all services, whether or not commitments have been taken. Most notable of these are most-favoured-nation (MFN) treatment (whereby a member accords immediately and unconditionally to services and services suppliers of any other member treatment no less favourable than that is accords to like services and services suppliers of any other country) and transparency. Many other general obligations, however, apply only to sectors where a member has scheduled specific commitments. Specific commitments on market access (Article XVI), national treatment (Article XVII) and additional commitments (Article XVIII) are inscribed in schedules. The schedules list the sectors in which specified levels of liberalization are guaranteed. Unlisted sectors are, as a result, only covered by the general obligations that apply across the board.

Market access (Article XVI) is defined as the prohibition on a government to apply six types of restrictive measures unless they are explicitly inscribed in its schedule.²⁰ The first four are quota-type measures. These measures may be discriminatory or non-discriminatory, i.e. they may affect only foreign or both national and foreign services or suppliers. They may be explicit quotas, or be implemented in the form of an economic needs test (a test that conditions market access upon the fulfilment of certain economic criteria) or other measures having the same effect.

In the dispute DS285 “United States – Measures Affecting the Cross-Border Supply of Gambling and Betting Services” (also known as US – Gambling), the panel found that a member would not respect the market access obligation if it restricted any means of delivery under Mode 1 (see endnote 19) with respect to a committed sector in which no limitations were scheduled. Under the interpretation, a measure that bans the electronic transmission of a committed service would, in principle, be inconsistent with commitments in which no relevant limitation is listed.

National treatment (Article XVII) prohibits a government from applying measures that treat foreign services or suppliers less favourably than national services or suppliers of the same type, unless a limitation is explicitly entered in its schedule. Whether formally identical or not, treatment is considered less favourable if it modifies the conditions of competition in favour of national services or suppliers. For

example, forms of local data processing or storage requirements, or other restrictions on data flows, might infringe on a national treatment commitment under one of the modes of supply if they adversely affect the competitive opportunities of foreign services and suppliers relative to domestic services and suppliers.

Additional commitments may also be negotiated and inscribed in schedules by members (Article XVIII). These are legally binding positive undertakings with respect to measures that are not market access and national treatment limitations. In fact, additional commitments were designed to address possible gaps in existing rules that drafters might not have envisioned at the outset, e.g. to address unforeseen trade barriers or regulatory constraints. Thus, they can include undertakings that promote best practices, as was the case for telecommunications (see below). It is the first and only sector, so far, for which additional commitments have been taken on regulatory principles.

Annex on Telecommunications and Reference Paper

Of particular interest for e-commerce are two sets of obligations that focus on telecommunications services: the Annex on Telecommunications, which applies to all WTO members, and the Reference Paper on Regulatory Principles on Basic Telecommunications, which has been incorporated into the Schedules of Commitments by 103 WTO members. The Annex was concluded in recognition of the central role of telecommunications as a medium of transporting services. The Reference Paper aims to address the difficulty of effectively realizing commitments on liberalization in a sector typically characterized by dominant operators following the introduction of competition.

The Annex on Telecommunications ensures that suppliers of all scheduled services have access to and use of public telecommunications transport networks and services (i.e. basic telecommunications) on reasonable and non-discriminatory terms and conditions.²¹ The Annex on Telecommunications is of particular significance for e-commerce. It was drafted during the Uruguay Round (1986-1993) by negotiators who realized that, despite the competition-related provisions in Article VIII of the GATS, telecommunications operators were in the unique position of having sufficient market power potentially to undermine scheduled commitments in any service sector in which telecommunications were essential to doing business. Today, the use of communications networks and services has become even more integral to global business activity,

especially online supply and sales of services, than it was when the Annex was first negotiated.

The Annex carries its own generally applicable non-discrimination disciplines on telecommunications service suppliers, notwithstanding whether specific commitments have been scheduled under telecommunications services. The term “non-discriminatory” is defined in the Annex as referring to both MFN and national treatment, as well as to sector specific usage of the term.²² As a result, the suppliers of any service listed in a schedule, such as computer services, accountancy services or financial services or even other telecommunications, are thus assured of non-discrimination with respect to access and use. In terms of e-commerce, moreover, the Annex has the potential not only to afford internet access providers reasonable and non-discriminatory access to circuits and other internet backbone facilities obtained from operators; it can also ensure reasonable and non-discriminatory access by a range of suppliers of services over the communications networks.

It is of particular significance to online activity and the incumbent data flows involved that the Annex addresses information transfers.²³ It requires members to ensure that foreign service suppliers may use basic telecommunications for the movement of digitalized information both within and across borders, including for intra-corporate communications and for access to information contained in databases or otherwise stored in the territory of any member. All suppliers of committed services benefit from these obligations.

The regulatory principles embodied in the Reference Paper on Regulatory Principles on Basic Telecommunications govern the prevention of anti-competitive practices, the terms of interconnection, licensing criteria, transparency, the independence of regulators from suppliers, universal service, and other matters relevant to the prevention of abuse of dominant market positions with respect to basic telecommunications. These additional commitments were undertaken by 103 WTO members.

The Reference Paper, insofar as it promotes competitive conditions in the supply of telecommunications services, should help foster the extension of affordable and efficient infrastructure for e-commerce. It was developed because of the concern that, despite the commitments undertaken, telecommunications markets would still frequently be characterized by dominant suppliers, referred to as “major” suppliers in the text, that controlled bottlenecks or essential facilities and would be able to frustrate the effective realization of commitments if entirely free to decide how to treat their new competitors.

GATS exceptions

Concerns about online intrusions of privacy, the potential for fraud or other illicit activities (i.e. cybercrime), and the protection of transmissions against hacking (i.e. cybersecurity) have characterized discussions surrounding the internet since its inception. Such issues have gained greater prominence recently as the internet has become globally widespread and capable of more sophisticated business and personal activities thanks to broadband technologies.

Better understanding the general exceptions provisions of Article XIV and security exceptions of Article XIV *bis* of the GATS and how they operate therefore has considerable relevance to e-commerce. General exceptions permit members to take GATS-inconsistent measures if they are “necessary” to achieve certain public policy objectives. These objectives include the protection of public morals and the maintenance of public order, as well as securing compliance with laws or regulations – in themselves consistent with the GATS – for the protection of the privacy of individuals and the prevention of deceptive and fraudulent practices.

Article XIV is also subject to safeguards against abuse in that GATS-inconsistent measures taken under it must be “necessary”. Put simply, this means that the inconsistent measures must themselves be necessary to achieve particular objectives. A measure would not be considered necessary, for example, if an alternative measure that is less trade-restrictive would achieve the same objective. The general exceptions also may not be applied in a manner which constitutes unjustifiable discrimination between members or used as a disguised restriction on trade in services.

Article XIV *bis* on security exceptions allows a member to take any action that the member considers necessary for the protection of its essential security interests relating to the supply of services for the provisioning of a military establishment, relating to fissionable and fusionable materials and the materials from which they are derived, or taken in time of war or any other international relations emergency. Article XIV *bis* does not convey the same standard of “necessity” as Article XIV.

Specific commitments relevant to e-commerce

As a number of GATS disciplines apply only to committed services, the most advantageous conditions for digitally-enabled services are achieved when commitments exist and when those are as open

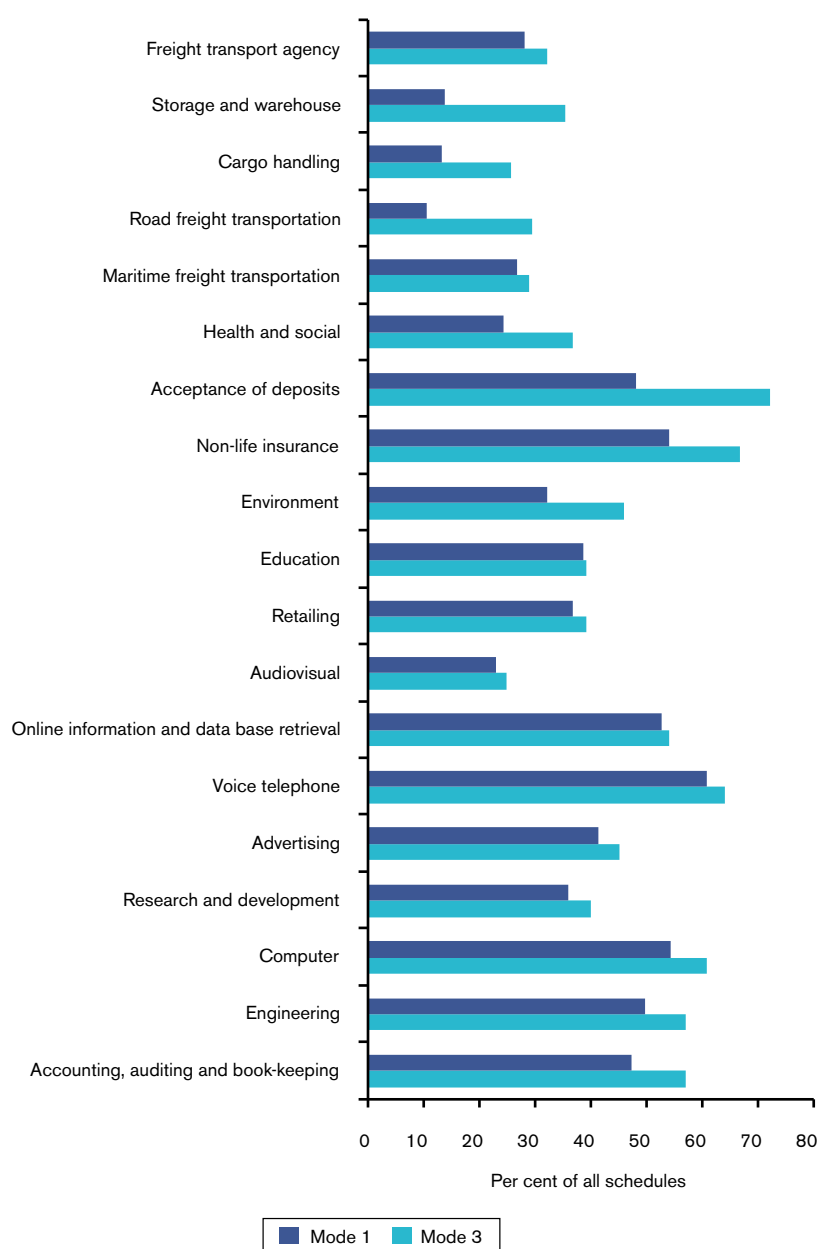
as possible. The uncertainty stemming from the lack of multilateral bindings for services, in particular market access and national treatment measures, carries additional trade costs. Research has underscored that the predictability of market access conditions underpinned by the WTO system of disciplines has commercial value in itself (WTO, 2014b). In the case of goods, trade policy uncertainty measured as the gap between bound and applied tariffs (also known as tariff “water”) is a significant trade impediment (Osnago et al., 2015).²⁴ Recent studies corroborate that services commitments in the GATS, as well as in regional trade agreements (RTAs), have a positive impact on services trade (cross-border or through commercial presence) when controlling for applied levels of openness. Further, services commitments that bind the *status quo* incite trade more than commitments that have “water” (Lamprecht and Miroudot, 2018).

In the WTO, some members have responded by taking commitments, in the Uruguay Round and in subsequent accessions, in a range of ICT-enabled sectors. Sometimes, such commitments, in the form of phasing-in commitments in telecommunications, have accompanied and encouraged further reforms. In other cases, commitments have bound the *status quo*. Members have also responded by negotiating and committing to the Reference Paper on Regulatory Disciplines for the Telecommunications Sector.

Overall, members have so far made uneven use of the GATS commitments to reduce trade barriers or guarantee existing levels of openness. The proportion of schedules that contain commitments on cross-border supply and commercial presence for such digital infrastructure services such as voice telephony, computer services, and online information and database retrieval, for example, is higher than in a number of other services sectors, but more than one-third of schedules provides no guarantees of treatment in these areas (see Figure D.1). Retailing services, which include online retailing services, are uncommitted in the majority of members’ schedules. Further, the number of schedules containing commitments on Mode 1 is limited in relation to services, where the increasing performance of digital networks provide opportunities for cross-border electronic supply, such as accounting, engineering, research and development, advertising, audiovisual and educational services. The proportion of members’ schedules that includes additional commitments in relation to the Reference Paper on Basic Telecommunications stands at 58 per cent (Roy, 2017).

As discussed in Section D.3(d), a number of governments have also responded by using services

Figure D.1: Percentage of schedules with commitments for Modes 1 and 3 in selected sectors



Source: Roy (2017).

Notes: The figure shows whether guarantees of a minimum level of market access and national treatment are provided for each sector and mode. It does not assess the level of openness guaranteed, how this level relates to the openness currently granted in practice, or whether it contains “water”. (For definitions of Modes 1 and 3, see endnote 19).

RTAs, to a much greater extent on average than GATS commitments, to bind access conditions for the cross-border supply of services (including in some cases digital supply) as well as to guarantee levels of market access and national treatment for the establishment and operation of foreign entities wishing to provide, for example, digital infrastructure services.

Looking forward, the fact that most commitments under the GATS date from negotiations concluded 20 years ago represents the single most important gap in the coverage of e-commerce in services. Updating these commitments would be possible, should WTO members decide to do so, given the considerable levels of unbound liberalization in place.

(iii) Trade in goods

This section explains how the multilateral rules for trade in goods have remained relevant in the face of technological developments. It also shows that, notwithstanding the capacity of WTO rules to adapt, there have been instances where divergences of opinion have emerged on their interpretation, some of which have been solved through collective action or by plurilateral initiatives that promote specific outcomes.

Interpretation of existing trade rules in the context of new technologies

Situations may arise where new technologies lead to differences in opinion as to how the rules should be interpreted and understood, at least initially. This section will describe how the rules seem to apply to trade in 3D printed goods, including some issues that may become increasingly important, and how members have dealt with the interpretation of two cases derived from the “servicification” of manufacturing (when the manufacturing industry is increasingly relying on services as inputs into the production process, as well as producing and exporting more services along with goods).

3D printing

As explained in Section B, 3D printing refers to manufacturing processes in which a material (such as liquid molecules or powder grains) is joined or solidified under computer control to create a three dimensional object based on a digital model such as a 3D model, a computer-aided design (CAD) or an additive manufacturing file (AMF). Despite the advanced technology used, objects “printed” using this technique are not significantly different from those produced using traditional manufacturing techniques that rely on design works, plans, or sketches.

If an object is designed in one country and the instructions for its manufacturing are transmitted to another country, it is evident that what is being transmitted is not the object itself, but rather a design or plan that then allows a company to produce one or more units of that particular model. But what happens if the 3D printed good are then exported to another country? Under the existing rules, they would not be treated differently from goods manufactured based on designs developed in another country or the same country of exportation. There are, however, two sets of rules that may become increasingly relevant in determining such treatment.

The first one relates to Article 8 of the WTO Customs Valuation Agreement (CVA), which requires customs authorities to add certain additional payments to “the price actually paid or payable” of the imported goods.²⁵ Article 8:(1)(b)(iv) expressly requires customs to include in the customs value payments for “engineering, development, artwork, design work, plans and sketches, *undertaken elsewhere than in the country of importation* and necessary for the production of the imported goods” (emphasis added). Given the qualification in the provision, the country where these “engineering, development, artwork, design work, plans and sketches” are produced has an impact on the customs value of the imported goods. Thus, all things being equal, if a 3D printed object is imported into the country where the 3D model was developed – which would not occur in the event that the object was simply printed in the same jurisdiction in which the model was developed – the object would have a lower customs value. However, if goods are printed for export, it may be increasingly difficult for customs to take account of such costs, particularly in cases where these are not declared by the importer and there are no proper post-importation audit procedures in place.

A second exception relates to rules of origin (the criteria needed to determine the national source of a product), which vary depending on the specific methodology used to determine “substantial transformation” for a particular case. While the cost of the 3D model might be taken into account in the case of rules based on value addition (i.e. whether these works and plans are originating or non-originating), they will not play any role if, instead, origin is determined based on a change in the tariff classification (i.e. because only the tariff classification of the physical inputs incorporated into the final product are taken into account) or specific manufacturing processes. Since WTO members have not yet concluded the harmonization work programme, there are currently no product specific non-preferential rules of origin at the WTO, so each member can determine its own rules. In the context of preferential schemes, there is also a wide diversity in the types of rules of origin applied by members, which could make it increasingly difficult to determine which rule to apply in the case of 3D printed objects.

Although the issue has not been specifically discussed by WTO members, there does not seem to be a *prima facie* case for treating 3D models, CADs or AMF files differently from traditional engineering, development, artwork, design work, plans and sketches. The latter have been routinely developed and transmitted digitally over the past decades. Under

one view, 3D printing does not present anything essentially new in terms of current customs rules and procedures, which would suggest that the rules do not require an adjustment (Kafeero, 2016). However, as also discussed by Patrik Tingvall, Chief Economist and Magnus Rentzhog, Senior Adviser, National Board of Trade (Kommerskollegium) (see their opinion piece on page 158), this is not necessarily a consensus view. During a 2015 meeting at the World Customs Organization (WCO), some customs experts considered that it was necessary to discuss “the possible implications of 3D printing on origin, valuation, IPR and security” (WCO, 2016). Some of them also considered that, in addition to revenue-related issues, “there might be a need to redefine the term ‘goods’ in the future”, which is “relevant for Customs responsibilities in 3D printing overall”.

Servicification of manufacturing

The “servicification” of manufacturing refers to the situation in which the manufacturing industry is increasingly relying on services as inputs into the production process, as well as producing and exporting more services along with goods. Services are increasingly traded indirectly by being either embedded or embodied in goods exports, and not only directly (Drake-Brockman and Stephenson, 2012). The existing rules still apply to trade in *all* goods, without distinguishing whether they include embodied or embedded services. There are, however, some agreements that do take such aspects into account. For example, the CVA already prescribes the types of services that can, or cannot, be taken into account when determining the customs value of a good. As previously explained, the preferential and non-preferential rules of origin based on value addition also take into account certain services to determine the “substantial transformation” of a good.

On the valuation side, the Technical Committee on Customs Valuation (TCCV), which was established by the CVA and meets under the auspices of the WCO, has discussed two cases that have dealt with these issues. The first one involved a service contract with an engineering firm: a company in Country A entered into a service contract with an engineering firm in Country B, for a specific amount (e.g. US\$ 1 million), for the construction of an industrial plant in Country A. Once the engineering firm completed the plans, it produced blueprints that were then exported in paper form from Country B to Country A. At the time of importation, customs authorities in Country A had problems determining the relevant customs value of the imported documents. In particular, it was not clear whether such value corresponded in full to the amount paid to the engineering firm. Was the

customs value of those plans the amount paid to the engineering firm under the services contract (i.e. the US\$ 1 million) or something else?

In 2009, the TCCV adopted by consensus Advisory Opinion 22.1, which notes that because the documents were “tangible”, they should, therefore, “be regarded as ‘goods’ for which determination of the customs value is required” (WCO, 2016). However, since the payment to the engineering company had been for the services performed under a services contract (i.e. it had not been a payment as consideration for the documents themselves), it could not be taken into account in the customs value of the imported documents. One of the key elements to arrive at this conclusion was that the documents had not been “sold for export”, which is one of the key requirements to apply the transaction value methodology. It was further acknowledged that the remaining valuation methods were also inapplicable to this particular case, in which case the “fall-back” method of Article 7 of the CVA would have to be used.²⁶ Under this provision, customs value must be determined in consultation with the importer in a flexible manner.²⁷ Beyond this advisory opinion, it is worth noting that, had the documents been transmitted electronically and printed in Country A, customs authorities would not have become acquainted with the engineering contract.

A second issue that was discussed by the TCCV between 2013 and 2016 involved the treatment of fees for unlocking a function of imported goods after importation. More specifically, it dealt with digital copiers that had incorporated a special locked application software (i.e. a security function), which was an optional component that could be unlocked by the final buyer after buying a code or password from a third party who owned the copyrights. In other words, the application software had not been developed and licensed by the manufacturer, but rather by a non related third party, in a manner akin to a smartphone app.

The manufacturer included the application software in all imported copiers for convenience, but the application could not be used without the code or password, which had to be bought by the final user as an internet download. The question was whether the customs value of those digital copiers should also include the value of that additional locked function, when it had been taken up by the buyer. During the TCCV discussions, several delegates were of the view that this type of voluntary fees for functions that could be unlocked post-importation should not be includable in the customs value, and proposed to adopt an instrument confirming this interpretation.

OPINION PIECE

“Is the WTO 3D printing-ready?”

By Patrik Tingvall, Chief Economist and Magnus Rentzhog, Senior Adviser, National Board of Trade (Kommerskollegium)

New disruptive technologies are affecting firms' production decisions and reshaping global patterns of trade and investment. 3D printing, or additive manufacturing, is a perfect example.

An article in the *Global Trade Review* suggests that 3D printing may wipe out as much as 40 per cent of world trade by 2040 (ING, 2017). The question asked here is: what challenges will the progress of 3D printing have on WTO and the multilateral trading system?

With 3D printing, computer-aided design (CAD) data is used to build physical objects by adding material layer by layer. 3D printing is already changing trade and production flows by moving production closer to customers, reducing transportation time, allowing for customized production, and lessening the need to stock products. We also see new types of firms emerging, such as CAD designers, CAD-file market places, and 3D-print shops. On the supply side, we see new “ink” producers challenging established firms. 3D printing is also bringing about labour market changes, from goods- to services-related occupations, such as CAD-design programmers and designers, post-production specialists, 3D material experts and consultants.

From a trade policy perspective, one can say that certain stages of the manufacturing production are merged into the 3D printing process, which in turn replaces trade in intermediate goods.

Even if it is difficult to make an exact prediction of the future landscape of trade and production, they appear to point toward increased trade in services, data, IPR and user rights.

The speed and magnitude of this transmission will partly depend on the regulatory environment governing trade and location of 3D printing activities.

Current WTO rules generally work well in the ongoing transition from trade in goods to trade in services, as concluded in a study by the National Board of Trade, Sweden. There are several reasons for this, including the fact that many WTO rules are flexible and technologically neutral.

Nevertheless, with the evolution of 3D printing and the shift from trade in intermediates to cross-border data flows, including IP content, we anticipate three ways in which 3D printing may challenge the multilateral trading system.

First, WTO rules on goods do not apply if there is no cross-border trade. Tariffs and trade facilitation are obvious examples. Additionally, agreements like the Anti-dumping Agreement become less relevant when there is no border crossing and when production can be easily moved out of the country facing anti-dumping duties.

Second, some agreements, or parts of them, gain importance at the expense of others. Most notably, services take centre stage, making GATS relatively more important. In other agreements, 3D printing changes how countries can use them. Under the Anti-dumping Agreement, questions arise on how to prove dumping and how to enforce an anti-dumping decision if production can be moved easily. For rules of origin, proof of origin must be shown in different ways.

Finally, some rules might need to be updated, for example:

- There is no horizontal rule on the right to transfer data, and if measures are not covered by commitments made, this opens up the possibility of protectionism and barriers on digital transfers.
- The increased degree of product differentiation complicates the use of rules of national treatment and the notion of a “like” product.
- Insufficient rules on export restrictions open the door for curbing exports of raw material and “ink”.
- Differences in intellectual property rights between countries will become increasingly important in regard to where actual production will take place. In addition, current rules can be hard to apply to 3D printing.
- The GATS lacks detailed rules on issues such as subsidies. This makes WTO members less bound by trade regulations, meaning that companies that embrace 3D printing also move into less regulated territory.

In summary, the production and trade landscape is changing rapidly, with 3D printing as a key contributor. As shown, trade rules will not be a major barrier. However, some adjustments might be needed to ensure that WTO regulations do not stand in the way of progress. At the same time, it is also vital that the WTO is capable of providing clear and safe regulations for the multilateral trading system.

However, others disagreed with this view, commenting that the approach would risk creating an incentive for traders to design products to artificially reduce their customs value (e.g. by lowering the value of the device and increasing the value in locked functions for which consumers would almost certainly wish to pay) (WCO, 2009). The issue was discussed in several sessions of the TCCV, but they were not able to arrive at a consensus. As a result, if such circumstances arise, national customs authorities should interpret the rules of the CVA on a case by case basis, as they see fit.²⁸

The two cases mentioned above illustrate the different stages with respect to some of these emerging challenges. In the case of exports of 3D printed goods, members do not yet seem to be facing any major challenges in the interpretation and implementation of the rules. However, this may change as the importance of the technology increases. In the case of the “locked functions” in apparatuses, members have discussed the correct interpretation of the rules, but have not been able to arrive at a common decision that would have harmonized the interpretation of the rules. Advisory Opinion 22.1 provides an interesting example of joint cooperation by members in clarifying the interpretation of the rules for a particular situation. One advantage of this outcome is that it results in increased transparency, security and predictability for traders, compared to the two other cases in which trade operators are likely to face different interpretations for identical situations.

How the legal texts have been adjusted to take digital technologies into account

Notwithstanding the capacity of existing WTO agreements to adapt to new technologies, there have also been situations in which GATT contracting parties and WTO members have decided to develop new provisions to tackle specific problems or take actions with a view to responding to emerging digital technologies.

Customs value of “carrier media bearing software”

In 1979, the Tokyo Round Code on Customs Valuation (the “Valuation Code”) moved away from the notion of “normal value”, under the Brussels definition of customs value,²⁹ in favour of the “transaction value”, which was defined as “the price actually paid or payable for the goods, when sold for export to the country of importation”. Under the then new rules, the value would be set on the amount that was “actually paid” for the imported goods, and not on the basis of the amount that the importer “should

have paid” for the product. One year after its entry into force, participants to the Valuation Code faced a problem with regard to the valuation of software, which at that time was usually imported by means of punch cards, magnetic tapes, and discs (so-called “carrier media”).³⁰ In particular, it was not clear how to apply the “transaction value” concept to the valuation of the software. Was the importer paying for the software (i.e. an “intangible”) or for the carrier media bearing it (i.e. the “tangible” part that could be observed by customs officers)? The practice that had been followed by many countries prior to the entry into force of the Valuation Code was to calculate and collect import duties based exclusively on the carrier medium’s value.³¹

Following almost two years of discussions, the Committee on Customs Valuation agreed on a decision on the valuation of carrier media bearing software, which reaffirmed the primacy of the transaction value and recognized that parties to the Valuation Code could choose between two options:³² (1) parties could base the custom value on the price paid or payable for the software itself; or (2) parties could base the custom value on the cost of the carrier medium itself, excluding the cost or value of the software contained therein, provided that the two values had been differentiated on the invoice. In 1982, on the date of the adoption of the Decision, the Chairman of the Committee noted that:

“In the case of imported carrier media bearing data or instructions for use in data processing equipment (software), it is essentially the carrier media itself, e.g. the tape or magnetic disc, which is liable to duty under the customs tariff. However, the importer is, in fact, interested in using the instructions or data; the carrier medium is incidental. Indeed, if the technical facilities are available to the parties to the transaction, the software can be transmitted by wire or satellite, in which case the question of customs duties does not arise. In addition, the carrier medium is usually a temporary means of storing the instructions or data; in order to use it, the buyer has to transfer or reproduce the data or instructions into the memory or database of its own system” (GATT, 1984b).

The so called “Carrier Media Decision” was subsequently readopted by WTO members after the conclusion of the Uruguay Round (GATT, 1995). To date, some 30 members have notified the WTO that they levy duties based exclusively on the cost of the carrier media and not on the value of the data or software (see Rev. 28 of GATT, 1984a). It is worth highlighting that the concept of carrier

media in this decision excluded “integrated circuits, semiconductors and similar devices or articles incorporating such circuits or devices”, which eventually led to new interpretation challenges. This is because the Decision does not seem to apply to software imported by means of a USB flash drive, which contains integrated circuits. After discussing it, the TCCV was brought to the attention of the WTO Committee on Customs Valuation (2013a; 2013b). In November 2013, one delegation proposed to amend the Carrier Media Decision to take account of this technological development, but members have not to date reached consensus on this proposal (WTO, 2014a).

Liberalizing trade in information technology products

In 1996 a subset of 29 WTO members adopted the Information Technology Agreement (ITA) with a view to promoting faster technological change. This sectoral initiative eliminated tariffs on a number of essential information technology products, including computers, mobile phones, and most of the technological devices necessary to build and access the internet. Beyond the economic importance of these products, the main impetus for the negotiations derived from the positive impact that IT products could have on the economy and competitiveness of its participants, through improved business and manufacturing efficiency. The economic transformation towards a “global information society” required governments to promote affordable access to information technology which could be promoted by, for example, liberalizing trade in these products. Removing obstacles to trade in IT products would ensure that the new infrastructure would be built as quickly and as inexpensively as possible (WTO, 2012a).

In 2012, a group of WTO members submitted a “concept paper for the expansion of the ITA” (WTO, 2012b), which eventually led to concluding the “Expansion of the Information Technology Agreement” in December 2015 (see also GATT, 1995). Rapid changes in production methods, coupled with an increase in the speed of technological development, had transformed the sector and led to a series of new products that were not covered by the ITA. These included GPS systems, a new generation of medical devices, and an entirely new class of semiconductor chip called “multicomponent” semiconductors (MCOs) (Ezell, 2012). The ITA and the Expansion Agreement may play a key role in facilitating access to technology. In the right circumstances, they may also help firms in member countries integrate into global production networks and spur innovation in other sectors, thereby benefitting the economy as a whole (WTO, 2017a).

Digital technologies and the Trade Facilitation Agreement

The most recent example of multilateral trade rules being updated to take account of new digital technologies is the WTO Trade Facilitation Agreement (TFA), which entered into force on 22 February 2017.

Unlike the multilateral agreements that resulted from the Uruguay Round, which largely ignore the question of the technologies that may be used by members in order to comply with their obligations, the TFA makes explicit reference to a number of digital technologies. For example, Article 1.2 of the TFA goes well beyond the transparency provisions in Article X of the GATT by requiring members to make available “through the Internet” several categories of trade-related information. Article 7.1 requires members to allow for pre arrival processing of import documentation and includes provisions for the advance submission of documents in “electronic format”. This is complemented by Article 7.2, which provides that members shall, to the extent practicable, allow for the option of “electronic payment” of duties, taxes, fees, and charges collected by customs. Article 10.2.2 requires government agencies to accept “electronic copies” when another government agency of the same member already holds an original of such document. Article 10.4 encourages members to implement a single window that will, to the extent possible and practicable, make use of “information technology” to support it. Finally, Article 12, which deals with international customs cooperation, envisages that communications (i.e. requests and answers between customs authorities in different countries) could take place through electronic means.

Although the TFA refrains from making similar references to specific technologies in other provisions, members are increasingly relying on digital technologies to implement most of its provisions, which is explained by the efficiency gains derived from relying on the interconnection of different electronic systems. This includes, for example, the provision in Article 7.4 concerning risk management, which in many countries has been designed as an electronic system that operates based on digital data shared with other systems, such as the information submitted for pre arrival processing, the database of authorized operators, and the availability of electronic copies of documents, much of which can be linked through an electronic single window.

Notwithstanding the capacity of WTO rules to be adapted to new situations, these three examples show that members have occasionally found it useful

to clarify specific aspects of the agreements or to adopt policy actions to promote specific outcomes.

(vi) Trade in agricultural products

The Agreement on Agriculture limits the use of trade-distorting support and permits unconstrained government spending on programmes that have no, or at most minimal, trade distorting or production effects. Annex 2 of the Agreement on Agriculture defines the scope of the latter and outlines detailed compliance criteria for granting such support. Several government policies permitted by Annex 2 would support digitalization and the introduction of innovative agriculture techniques and production practices.

This is particularly the case for “general services”, a category of government support that accommodates policies that benefit the agriculture sector and rural communities as a whole. For instance, “pest and disease control” measures such as early-warning, quarantine and eradication systems could be computerized to minimize labour costs and enhance the accuracy of inspection, monitoring and traceability.

According to the Agreement, knowledge and skill-building to use digital data can be achieved through “training services” and “extension and advisory services”, which include the provision of means to facilitate the transfer of information and the dissemination of results of research to producers and consumers. “Marketing and promotion services” include market information and advice and promotion relating to particular products. Digitalization can also be applied in “infrastructural services”, including electricity reticulation (i.e. the provision of all equipment necessary to allow the delivery of electricity from the point of connection of a distribution network service provider’s assets to sources of electricity supply, to the point of connection of an electricity consumer or of an electricity supply authority), water supply facilities and infrastructural works associated with environmental programmes. Government investments in these facilities are not subject to any limit, provided the expenditure is directed to the provision or construction of capital works only, and excludes the subsidized provision of on-farm facilities other than for the reticulation of generally available public utilities.

Disciplines contained within the Agreement on Agriculture relating to environmental or resource conservation policies contain adequate flexibility to promote comprehensive, innovative approaches to data, knowledge and technologies in agriculture.

Innovative technologies including high-capacity sensors, and the massive data acquisition, storage, communication, and processing technologies to enable the development of new forms of knowledge, tools and services (Wolfert et al., 2017). However, in order for farmers to have access to data in a form that they can use, sophisticated and costly data-driven platforms to monitor and analyse the consumption of fertilizers, chemicals, energy and water in real-time may be required. Subject to benchmarks and conditions specified in Annex 2, agricultural producers may receive compensatory payments in the framework of such programmes in order to preserve agricultural ecosystems and spur the potential application of integrated digital solutions and innovative climate-smart technologies. The type of support may be particularly important for smallholder farmers who face significant hurdles in accessing new technologies (World Bank, 2017b).

Risk and uncertainty in agriculture stem from uncertain weather conditions, pests and diseases, and volatile market conditions and commodity prices. Managing agricultural risk is particularly important for farmers, and especially smallholders, because they lack the resources necessary to mitigate, transfer and cope with risk. Risk also inhibits external parties from investing in agriculture. Market inefficiencies and difficulties in coping with such risks by farmers may be used as a justification for introducing policies which could lead to market distortions.

However, as digital technologies offer cost-effective mechanisms for collecting, processing and disseminating data, they may help to reduce market inefficiencies resulting from poor and partial information and encourage recourse to policies covered by Annex 2 of the Agreement on Agriculture rather than to trade-distorting policies. More specifically, digital technologies can help farmers to mitigate against risks through tools like information services on weather (early warning systems) or prices (including through participation in spot commodity exchanges), as well as insurance mechanisms, including index insurance. However, factors like low levels of institutional development, the inability to customize products to meet smallholders’ requirements, and poor financial literacy still hamper the widespread use of these mechanisms in developing countries (World Bank, 2017b). More complete and reliable data can also provide a better understanding of risk factors involved in the agricultural activity and encourage commercial lending and participation from multiple market and development stakeholders in agriculture (FAO, 2017).

Digital technologies can also improve the capacity of governments to monitor policy outcomes and re-invent policy design which could, in turn, contribute to reforms in the agriculture sector. Given the rapid changes and accompanying uncertainties in the global agricultural sector, policy-makers may need to experiment with new policies on a small scale before these policies are more broadly implemented (OECD, 2017b). Digital technologies for data acquisition, processing and analysis can effectively support this type of policy experimentation, allowing governments, for example, to identify individuals and groups that are at risk and do not have adequate social safety nets. However, while there is an increasing need for governments to be able to adopt nimble approaches to agricultural policies, challenges persist with respect to data gaps and measurement capacity. Creating the conditions that will support the evolution of policy priorities will require that policy-makers reflect on the implications of transformations in the agriculture sector beyond the short term, and that they adopt proactive thinking to anticipate where future opportunities and challenges will arise.

(v) Trade related aspects of intellectual property rights

The IP system interacts with and supports e-commerce in diverse and increasingly significant ways. Some forms of services trade transactions comprise IP as such, and, similarly, in the case of many digital downloads purchased by consumers, an IP license can actually define the nature of the underlying commercial transaction. IP facilitates various ways of trading in physical goods and in services using electronic means: for instance, the IP system enables the electronic flow of data and information necessary for e-commerce to function.

The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) sets comprehensive minimum standards for the protection and enforcement of IP rights by incorporating pre-existing intellectual property conventions – administered by WIPO – into the WTO legal framework, and by adding and completing substantive standards over and above the level of previous conventions. This treaty technique means that the TRIPS obligations interact closely with the provisions of the WIPO conventions, and, consequently, that IP developments in the WIPO and the WTO form part of the multilateral IP system that strives to reconcile the meaning of different treaties and seeks to avoid conflict between them. (See WTO, 2000, *United States – Section 110(5) of the Copyright Act* at paragraph 6.70, which also takes into account WIPO treaties that were concluded after the TRIPS Agreement in order to avoid conflicts within this overall framework.)

The WTO TRIPS Agreement, and the integrated architecture of the multilateral IP system that it has created, thus constitutes a key component of the legal framework necessary for e-commerce and for international trade in intangible digital products. While TRIPS itself does not expressly address e-commerce or the digital environment as such, several of its provisions established a new international legal baseline that have supported and facilitated e-commerce. These include TRIPS disciplines on the non-discriminatory availability of IP rights, such as undisclosed information, copyright (including for software), patents and trademarks, balanced enforcement mechanisms, and the scope for competition safeguards. By establishing compatible domestic IP systems, the TRIPS Agreement helps build the legal structure in which rights to IP-protected digital products can be traded in the form of IP licenses, which in turn contributes to shaping commercial trans-border information flows.

General principles

Minimum standards and non-discrimination

Strict non-discrimination principles in the TRIPS Agreement, with fewer exceptions than those available under GATT and GATS,³³ ensure that any particular solutions individual members have implemented with regard to IP protection or enforcement in the digital environment (e.g. safe-guarding internet service providers from liability for IP infringement in user-generated content), or any additional IP protection they have made available in that regard (e.g. patent protection for software) – either in their national laws or in the context of RTAs – must be available to nationals from all WTO members, as a TRIPS obligation.

TRIPS flexibilities and development

The TRIPS Agreement contains elements of flexibility that allow members to seek appropriate policy responses to new issues raised by technological progress and the proliferation of e-commerce, and it has also enabled members to adapt the balance between IP rights and obligations in the online environment, where the operation of new business models such as search engines and information aggregator services contain new uses of IP-protected material.

Under the current TRIPS transition period regime, LDC members are exempt from applying the TRIPS Agreement – except for the non-discrimination principles – until 2021. Hence LDCs do not need to implement TRIPS IPR protection standards before

then, while their nationals can already enjoy the TRIPS standards for their own IP in other WTO members when engaging in online or offline commercial activity in their jurisdictions – a significant advantage as creative and innovative firms in LDCs seek effective access to global markets through e-commerce platforms.

Territorial nature of IPRs

IPRs are generally territorial in nature, which means that they are granted or arise separately in different jurisdictions, and the criteria for their validity or infringement are assessed separately according to the particularities of different territories. Trademarks or patents granted in one jurisdiction give rise to rights that are in principle only protected and enforceable in that country, and would not necessarily be infringed by activities in other territories. The TRIPS Agreement, and the provisions it incorporates from the Berne and Paris Conventions, are based on this understanding and provide various rules building on it, such as independence of protection in different jurisdictions.

Under the territoriality principle, IPR may differ considerably in scope from one member to another (and may be absent altogether in some members). This patchwork of distinct national IP rights poses challenges for the protection and enforcement of IPRs on the internet, as a global medium that straddles different jurisdictions. The extent of IP rights and their enforcement may vary significantly, and enforcement action by a right owner can, in many cases, involve costly multi-jurisdictional litigation and other procedures before numerous different national authorities. The TRIPS Agreement itself provides no specific rules on how its obligations on protection and enforcement of territorial IPRs could best be implemented in a space that transcends national boundaries.

However, over more than 20 years since the conclusion of the TRIPS Agreement, members' national jurisdictions have developed approaches and solutions to tackle these questions, which, in some areas, have settled into common practices that are now sometimes reflected in bilateral or regional agreements covering IPRs. The non-discrimination provisions in the TRIPS Agreement ensure that these national or regional solutions with regard to IPR protection in the digital sphere are available to nationals from all WTO members. A recent submission (WTO, 2016a) to the TRIPS Council suggested reaffirming the territoriality of copyright in the digital environment as a principle of the international trading system, in order to improve the business environment in the electronic copyright trade.

Substantive IPR standards

Given that the standards of IPR protection and enforcement provided for in the TRIPS Agreement create the very framework that is necessary to permit meaningful e-commerce and trade in digital products, it is clear that the vast majority of provisions are relevant for their operation. To highlight the pervasive significance of IPRs in this context, the following is a non-exhaustive selection of relevant substantive IPR standards that enable such trade to function smoothly.

Copyright and related rights

The implementation of TRIPS copyright standards by members provides the essential framework for e-commerce and international digital trade, as many digital products are defined in terms of the rights to use specific IPRs – often in the form of a license to use a copyrighted work. For instance, purchasing a video game, an app or a music file from an online retailer usually means obtaining a limited license from the rights-holder to use the copyright-protected software or sound recording, which can include the authorization to make a copy, and may include an authorization to obtain and use future updates of the game or software. That such a license can be legally traded and enforced is ensured by the TRIPS copyright standards on protectable works, including Article 10 on copyright protection for “Computer Programs and Compilations of Data”, and their implementation into national law.

Similarly, the viability of new online business models such as search engines, news aggregator services or platforms for user-generated content rely to a large extent on exceptions and limitations which define to what extent copyright protected content can be used (e.g. displayed by search engines or aggregators) without authorization from the original rights-holder. A recent submission to the TRIPS Council calls members to assert the principle that “exceptions and limitations available in physical formats should also be made available in the digital environment” (WTO, 2016a). The criteria under which limitations and exceptions are permitted in the area of copyright are defined by the so-called three-step-test in Article 13 of the TRIPS Agreement (defining three cumulative criteria for legitimate exceptions), which has been interpreted in the panel report on the dispute *United States – Section 110(5) of the Copyright Act* (WTO, 2000).

The traditional principles of international copyright law as contained in the Berne Convention and the TRIPS Agreement have proven to be sufficiently

flexible to accommodate new categories of works, and ways of creating and using protected materials in the digital environment. The issues listed below are only some examples of how specific elements of the copyright standards have been interpreted and applied in the digital context.

Also relevant are the so-called “WIPO Internet Treaties”, namely the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty, described in Section D.3(c).

Right of reproduction

Article 9.1 of the Berne Convention, as incorporated into the TRIPS Agreement, provides that “authors of literary and artistic works protected by this Convention shall have the exclusive right of authorizing the reproduction of these works”, and makes it clear that this right covers reproduction “in any manner or form”.³⁴ In addition, Articles 11 and 14.4 of the TRIPS Agreement provide for rental rights in respect of computer programmes and phonograms and, in certain situations, cinematographic works, given that uncontrolled rental of such works, whether in digital or analogue form, may lead to widespread unauthorized copying.

The right of reproduction, enshrined in the Berne Convention and the TRIPS Agreement, is the very essence of copyright, both in the offline and online environments. Protected material embodied on digital media such as CDs and CD-ROMs have become increasingly vulnerable to piracy, given the ease and diminishing costs of digital copying, and the fact that digital information can be copied and transmitted over and over again without any loss of quality. The online environment involves risks of new forms of piracy, where websites can offer protected materials for download without the authorization of or any remuneration to the rights-holders. The initial unauthorized transmission of protected materials may be combined with traditional forms of piracy at the recipient’s end. Therefore, the reproduction right and its effective enforcement are also essential in the new digital network environment.

The transmission of works and other protected materials over the internet or other electronic communications networks may involve a number of reproductions at various stages of the distribution chain. The first stage is the uploading of protected content to the host server at the point of transmission, and the final stage often involves downloading of that content by the end-user. The process of transmitting the content between these two points normally involves several intermediate and/or transient copies

made by service providers. How to deal with such intermediate and transient reproductions has been a difficult issue in international discussions, in particular between content and service providers. These discussions have concerned the questions of the extent to which transient reproductions are or should be included in the scope of the reproduction right, and, to the extent they are included in the scope of that right, what type of limitations to that right should be applied in respect of such reproductions. A related question concerns what is the most effective point of control and enforcement of the reproduction right and the liability of intermediary service providers.

Right of communication

As regards the act of transmission of digital works, the right of communication is particularly relevant. The Berne Convention contains a number of provisions, incorporated into the TRIPS Agreement, that regulate this right.³⁵ A question discussed at the international level is whether these provisions concerning the right of communication adequately respond to the needs related to interactive online communications or whether clarifications or adaptations are necessary. This question was also raised in the course of the preparation of the WIPO Copyright Treaty. Article 8 of the final text of the Treaty, entitled “Right of Communication to the Public”,³⁶ put the right of communication into a single provision containing two elements. First, it extends the right of communication to all categories of works. Second, it clarifies the application of the right in respect of interactive on-demand communications by confirming that the relevant acts of communication include cases where members of the public may have access to the works at different places and at different times.³⁷

Trademarks

Standards concerning the availability, scope and use of trademarks are found in Articles 15-21 of the TRIPS Agreement which, together with provisions incorporated from the Paris Convention (1967) through Article 2.1, define the subject matter, minimum rights, permissible exceptions and term of protection. As with the rest of the TRIPS Agreement, the obligations regarding the protection of trademarks and other distinctive signs do not distinguish between the digital environment and the physical embodiment of goods or services. In e-commerce, the use and protection of trademarks and other distinctive signs is essential for rights-holders establishing their presence on a global scale through the internet. For example, in the globalized tourism sector, consumers purchasing goods or services at a distance, such as flights, hotel reservations and tour packages, increasingly rely on

the reputation and standardized quality associated with the trademark or other distinctive sign.

Trademark use on the internet

Article 15.1 of the TRIPS Agreement provides that any sign, or any combination of signs, capable of distinguishing the goods and services of one undertaking from those of other undertakings, must be capable of constituting a trademark. In order to obtain protection, a company generally files for the registration of a trademark in each country in which it operates.³⁸ Registration is made in respect of specified goods or services. Members may make registrability depend on use (Article 15.2), and require use to maintain registration (Article 19). The question that may arise as regards the application of these provisions concerns the conditions under which the use of a trademark on the internet satisfies such requirements, and when it does, in which countries. The TRIPS Agreement requires that the owner of a registered trademark be recognized to have an exclusive right to prevent others from using, in the course of trade, identical or similar signs for goods or services which are identical or similar to those in respect of which the trademark is registered, if such use would result in a likelihood of confusion (Article 16.1).

In this respect, the question that has arisen is under what conditions and in which jurisdiction(s) the use of a sign on the internet might constitute an infringement of a registered trademark, and whether the current territorially-based system of registration of trademarks is sufficient for the emerging borderless electronic marketplace. Identical or similar signs registered as trademarks for identical goods or services may be owned by different persons in different countries; thus, even in respect of identical goods or services, the use of such trademarks on the internet by one or more of the rights-owners may lead to conflicts. The question of relevant use has also been examined in members' domestic jurisprudence, to determine whether certain non-visible use of word trademarks – such as in coded website tags which trigger search results, or in advertisement keywords (i.e. online search terms which trigger the appearance of certain advertisements) – is considered infringing use, and if so, in which jurisdiction.

Issues relating to the use of trademarks on the internet have led to the adoption of a “Joint Recommendation Concerning Provisions on the Protection of Marks, and Other Industrial Property Rights in Signs, on the Internet” (“Joint Recommendation”) (WIPO, 2001), by the Assembly of the Paris Union for the Protection of Industrial Property and the General Assembly of WIPO in September 2001³⁹ (see Section D.3(c)(v)).

Anti-competitive practices in the digital environment

As with the paper-based trading environment, anti-competitive issues are potentially raised by e-commerce, particularly in relation to intellectual property licensing arrangements. Article 40.1 of the TRIPS Agreement notes that “some licensing practices or conditions pertaining to intellectual property rights which restrain competition may have adverse effects on trade and may impede the transfer and dissemination of technology”. The need for the intellectual property system to function effectively as a means of promoting transfer and dissemination of technology is vitally important in relation to e-commerce technology, as for other forms of technology, especially considering the infrastructure concerns of developing countries.

There are possible instances of anti-competitive behaviour in relation to some online licensing arrangements. For example, a click-through license for the use of a website could be anti-competitive according to national law implemented consistently with Article 40 of the TRIPS Agreement. Such a license may also seek through contractual means to remove the effect of permitted exceptions intended to balance rights and obligations in a TRIPS framework. Competition considerations regarding abuse of IPRs are also relevant to address situations where issues of interoperability of devices or networks involve IP protected technologies or standards. Particular difficulties may arise where exceptions to exclusive rights in TRIPS compliant domestic legislation differ in some respects across jurisdictions.

The framework created by Article 40 recognizes the importance of competition policy for IP systems and creates a consultative basis on which members can exchange specific concerns in this area, including where they relate to e-commerce and trade in digital products.

Enforcement

The TRIPS provisions on enforcement, Articles 41-61, require members to ensure that enforcement procedures are available under those members' laws so as to permit effective action against any act of infringement of IPR covered by the TRIPS Agreement, including expeditious remedies to prevent infringements and remedies which constitute a deterrent to further infringements. The provisions on enforcement are not specific to infringements in any particular technological environment. Consequently, nothing suggests that these provisions would not be applicable to IPR infringements in the digital network environment covered by the TRIPS Agreement,

although it does not appear to be possible to apply certain provisions, in particular those on special requirements related to border measures, to online distribution. The speed and geographical scope of damage that illegal activities can cause, for example to holders of copyrights and related rights, emphasize the need for expeditious remedies, including injunctions ordered as part of a final decision or on an interim basis, to prevent infringements from occurring.

On the one hand, the use of new ICTs may be helpful in modernizing judicial procedures consistently with the objectives referred to in Article 41, in particular by making them more rapid and less complicated and costly. On the other hand, these technologies also create new challenges for the application of these procedures.

Jurisdiction and choice of law

As IP has traditionally been regulated, administered and enforced on a territorial basis, the “borderless” nature of the internet raises difficulties in determining the appropriate jurisdiction in respect of activities carried out on a global network. On the whole, the TRIPS Agreement is silent on this issue, although it appears to have been drafted on the presumption that the right to take action should be available in the jurisdiction in which the infringing act takes place. Articles 44.1 and 50.1 of the TRIPS Agreement contain explicit references to this effect.

As regards the choice of law applicable to copyright infringements, guidance is given in Article 5(2) of the Berne Convention, as incorporated into the TRIPS Agreement, which provides that “the extent of protection, as well as the means of redress afforded to the author to protect his rights, shall be governed exclusively by the laws of the country where protection is claimed”. A characteristic feature of the internet is that, once a work is put on the network in one country, it can be accessed anywhere in the world. This has led to discussions on the choice of law to be applied to a work posted on a website. Under traditional copyright concepts applied to the exploitation of works embodied in hard copies, the applicable law would appear to be that of the jurisdiction in which an act falling under copyright takes place. However, the problem with applying this approach to the internet is that if a website makes a posted work available worldwide, this potentially gives rise to the application of the laws of all jurisdictions in which the work can be accessed and liability under them. It has been argued that it would be preferable to apply to such exploitation of a work only the law of the jurisdiction from which the transmission originates. On the other hand, this approach has been seen as

having an obvious limitation, in that the relevant acts leading to worldwide exploitation of a work could be governed by the law of a country with low standards of protection.

Applying remedies for internet infringement

A related question is what remedies should be available if subject matter posted on a website is considered to infringe IPR, in particular when the transmission originates from another jurisdiction. For example, should injunctive relief (a remedy compelling a party to refrain from specific acts) be available in respect of a transmission that originates from another jurisdiction and, if so, would such an injunction be enforced by the authorities of that country? Or should damages be calculated on the basis of injury in the country where the action against the infringement was taken, or on a worldwide basis?

Even though questions concerning jurisdiction and related matters have already arisen in the context of traditional ways of exploiting IP, such questions are likely to become more common given the global reach of the internet. The question appears to be whether the existing rules of public and private international law, including international treaties relating to mutual recognition and enforcement of judgements, adequately address these types of situations, or whether additional clarifications are needed.

In applying TRIPS enforcement standards in the context of e-commerce and trade in digital products, members’ national jurisdictions have developed certain responses to specific practical challenges, some of which have also been reflected in other international or in bilateral agreements.

While digital reproduction and communication technologies create new risks of piracy, they also provide possible technical solutions to many problems faced by holders of copyright and related rights. Technological measures that can be used to facilitate the protection of copyright and related rights include copy protection (limiting the number of copies that can be made from an original reproduction), encryption (controlling access to online, satellite or other services) and watermarking (indicating within the material itself the original source of material, which can be used in tracking down piracy). The effective operation of such solutions may require that legislators provide adequate legal protection and effective legal remedies against the circumvention of the technological measures that are used by the holders of copyright and related rights to protect their rights. Given that this issue was not yet widely

discussed at the time of the negotiations that led to the conclusion of the TRIPS Agreement, it was not raised in the negotiations and no specific provisions concerning technological measures were taken into the TRIPS Agreement. However, the more recent WIPO Copyright Treaty and WIPO Performances and Phonogram Treaty recognize the role that technological measures used by rights-holders have in facilitating effective protection.

In conclusion, the standards for IPR protection and enforcement set out in the TRIPS Agreement are technology-neutral and apply regardless of whether the relevant criteria triggering an obligation are fulfilled on a digital network or in the physical world. Members' measures that affect use or protection of IPRs on the internet are subject to TRIPS obligations and disciplines. By defining the subject matter and the use-rights with respect to IPRs, the TRIPS Agreement provides much of the legal and conceptual framework necessary for e-commerce to function and for digital products to be traded in their intangible form. Its relevant provisions include substantive minimum standards relating to individual IPRs, the national treatment and MFN obligations, and transparency and cooperation obligations. Governments and businesses might nevertheless find value-added in an explicit recognition and affirmation of the applicability of the TRIPS Agreement to e-commerce.

While the traditional principles of international IP law have proven to be sufficiently flexible to accommodate both new technologies and ways of creating and using protected materials in the digital environment, technology and trade practices have developed significantly in the 20 years since the adoption of the TRIPS Agreement. As illustrated above, this has led members to develop specific approaches to how to apply TRIPS standards in the context of e-commerce and digital trade, which are reflected in many national laws and a number of international and bilateral treaties.

The non-discrimination principles of the TRIPS Agreement already ensure that any additional or more specific IP rights and advantages that members may implement in response to the above developments also benefit the nationals of all other WTO members. Beyond that, during the TRIPS-related discussions of the Work Programme on Electronic Commerce, several members considered the merits of clarifying the relationship of the TRIPS Agreement with some of these subsequent developments.

(vi) Aid for Trade

E-commerce development-related challenges are well known and range from infrastructure to capacity constraints particularly in developing countries and LDCs. As such, many have stressed the need to bridge the digital divide and address the related challenges as part of any effort to advance work on e-commerce. Technical assistance and capacity-building are key pillars of the WTO's work and play a fundamental role in furthering the understanding of the WTO Agreements and of other topics of discussion, including e-commerce. However, the WTO would not be able, on its own, to address all the challenges related to e-commerce.

To bridge the digital divide, additional finance must be mobilized to support the development of network infrastructure, dynamic ICT services markets, and adequate regulatory environments. Financing is essential to help develop affordable, reliable ICT infrastructure, and build up related services offerings, especially for under- or unserved populations.

Given the importance of services for connectivity, the Aid for Trade initiative, a WTO-led multi-stakeholder programme launched in 2005 to help developing countries, and in particular LDCs, to build the trade capacity and infrastructure they need to benefit from trade-opening, can play an important role in supporting the governments of developing countries in their efforts to enhance connectivity by adapting their policies to provide an enabling environment for investment, competition and innovation in digital infrastructure services. Roy (2017) sees two areas in which Aid for Trade could make a difference: by helping to improve foreign investment policy for services, and by providing assistance in reforming trade-related service sector policies and associated regulatory frameworks.

Improving foreign investment policy for services is key to attracting the foreign private investment needed to develop the digital infrastructure and thereby to contribute to achieving the United Nation's Sustainable Development Goals (SDGs) in developing countries. As emphasized by UNCTAD (2014), the contribution of the private sector is indispensable for many developing countries, as public financing alone will not suffice to meet SDG-related financing requirements. This is particularly true for the ICT sector, where private investment in public infrastructure, including land-based and submarine cables, dwarfs official development assistance: the former totalled US\$ 702 billion between 2004 and 2015, a hundred times more than official development assistance for communications (US\$ 6.8 billion) over the same period (Roy, 2017).

Improving trade-related service sector policies and associated regulatory frameworks is another area where Aid for Trade can make a difference. This assistance might consist in helping interested governments to design and implement policies in favour of connectivity services, involving, for example, the introduction of competition in monopolized segments of the telecommunications market or relaxing limits on the supply of certain key digital infrastructure services. It might also involve adapting and reinforcing regulatory regimes in services sectors subject to trade-related reforms. Introducing competition in telecommunications services, for example, typically involves changes in domestic policies regarding cross-subsidization and anti-competitive practices, interconnection, universal service obligations or the set-up and functions of an independent regulator.

Beyond the support in the services area, Aid for Trade plays an important role in assisting with trade facilitation. The TFA is a powerful tool to reduce trade costs. Trade facilitation tops the Aid for Trade priorities of both developing countries and their development partners, albeit in a broader conception that also includes physical connectivity, such as transport corridors, and digital connectivity too. There is also growing evidence of the positive impact of Aid for Trade in tackling border bottlenecks and contributing to inclusive trade outcomes.

As discussed in Section D.3(c), the Aid for Trade initiative is part of a broader effort to bridge the digital divide. The United Nations' 2030 Agenda for Sustainable Development includes targets for universal and affordable access to the internet, and several international organizations are undertaking initiatives that aim to bridge the digital divide.

(vii) Disputes before the WTO involving goods, services and digital technologies

The extraordinary development and diversification of digital technologies over the last couple of decades has made itself felt in the arena of WTO dispute settlement. As international trade increasingly involves both digital products and digital methods of transmission and delivery, the WTO dispute settlement has increasingly found itself tasked with resolving disputes related to aspects of the digital economy. These disputes often raise interesting and sometimes difficult legal questions.

Most WTO rules were drafted prior to the current digital revolution, and their application to new and innovative products and delivery systems can

therefore be challenging. But the WTO dispute settlement system is required to adjudicate disputes efficiently and effectively regardless of the products at issue. Dispute settlement panels and the Appellate Body have therefore had to resolve, within the existing legal framework, disputes relating to technologies that in some cases did not exist when the WTO agreements were being drafted.

One important digital economy-related issue that has arisen in dispute settlement related to the GATT is the tariff treatment of new technologies. All WTO members have "schedules" of concessions, legal instruments setting out in list form the maximum import tariffs (i.e. bound duties) that can be levied by members on different products. Relating to the GATS, WTO members have schedules of commitments detailing bound levels of market access and national treatment. Both GATT and GATS schedules are "binding", meaning that members are legally prohibited from imposing tariffs or limitations above their scheduled levels.

Problems can arise, for example, when new technologies do not clearly fit into any of the product categories listed in a member's schedule, or when they appear to fall under more than one category. This challenge existed even before the emergence of digital technologies. In the 1950s, the Government of Greece decided to impose an import duty of 70 per cent on "long-playing gramophone records" (33 1/3 and 45 revolutions per minute), much higher than the specific bound duty for "gramophone records, etc.". When challenged by Germany in the GATT, Greece justified its decision on the basis that such records had not existed at the time that the Greek Government had granted that particular concession during the Ancey and Torquay Rounds, and that they were technologically different from the new ones (i.e. they contained a volume of recordings up to five times that of the old records, were lighter and made of a different material). For Greece, those "new products" were not covered by the scope of the concession.

However, this interpretation was rejected by a Group of Experts in "Greek increase in bound duty" (GATT, 1956), who recalled that "the practice generally followed in classifying new products was to apply the tariff item, if one existed, that specified the products by name, or, if no such item existed, to assimilate the new products to existing items in accordance with the principles established by the national tariff legislation". Because the concession had not placed any qualification upon the words "gramophone record", the Group of Experts concluded that the new long-playing gramophone records were also covered by the scope of this concession.

In the WTO, panels and the Appellate Body have considered variations of this problem in a number of cases. For example, in *EC – Computer Equipment*, the issue in dispute was whether certain types of LAN (i.e. local area network) equipment that had not existed at the time when the European Communities' schedule had entered into force were covered by the concessions on “telecommunications equipment” or “Automatic Data Processing Machines”. This seemingly technical question had important consequences for the applicable tariff rate. In resolving this dispute, the Appellate Body confirmed that schedules are an integral part of the WTO treaty system, and must therefore be interpreted according to the ordinary rules of treaty interpretation and thus on the “basis of the ordinary meaning of the wording of the respective Schedules”. On this basis, the Appellate Body found the panel's legal reasoning to be erroneous and thus reversed the panel's finding that the European Communities had violated its commitment of concessions for LAN equipment under the GATT.

In practice, this means that the proper tariff treatment of goods, including new digital equipment, does not depend on the subjective understanding of the scheduling member, but on the proper interpretation of the scope of the concession in a member's schedule in accordance with the various interpretive tools that exist in customary international law. Moreover, the meaning and coverage of the words actually used is not frozen in time at the moment when the schedule entered into force. Rather, as the scope and content of words change over time, such changes may be reflected in the coverage of the schedule. Following the same logic as that in the Greek gramophone records case, the question of whether a new product is covered by a commitment in a schedule of concessions is ultimately determined by properly interpreting the terms of the concession in accordance with the rules of customary international law.

The same approach was subsequently taken in *China – Publications and Audiovisual Products*, where the question at issue was whether a GATS commitment in China's services schedule concerning “sound recording distribution services” covered network music services, i.e. the distribution of music over electronic networks, such as the internet. Contrary to China's view that network music services constituted an entirely new type of service that did not come under any of the commitments made in China's services schedule, the Appellate Body, applying the rules of treaty interpretation and focusing on the “plain meaning” of the words used in China's schedule, found that the words “sound recording distribution services” were “sufficiently generic that

what they apply to may change over time” (WTO, 2009). Confirming its approach in *EC – Computer Equipment*, the Appellate Body explained that, from a legal perspective, what matters is not the subjective understanding of the scheduling member but the meaning and coverage of the specific words used in the particular commitment at issue. Having interpreted China's commitment on “sound recording distribution services” according to the customary rules of treaty interpretation, the Appellate Body found that network music services fell within the scope of the relevant commitment. Neither China's own understanding of the commitment nor the range of existing music distribution services at the time the commitment was made were determinative in this respect. Thus, as the range of existing “music distribution services” expanded and diversified due to technological innovation, so did China's generically-worded commitment cover those newly developed methods of distributing music – including distribution over the internet.

Disputes may arise not only when new digital equipment enters the market, but also when existing products are modified or improved and take on additional capabilities or functions. For example, during the 1990s, computer and video monitors used to be distinct products with different technical characteristics, and one could not be used to replace the other because they used different connection interfaces. The version of the Harmonized System used in the Uruguay Round Schedules established separate categories, so members could levy different duty levels on them. However, technology eventually evolved to a point where multifunctional monitors entered the market, including flat panel display devices (FPDs), i.e. certain types of monitors or screens that can be connected both to a computer and other video sources thanks to the inclusion of multiple connection interfaces (e.g. DVI – digital visual interface – and HDMI – high-definition multimedia interface). But should these be treated as computer monitors or video monitors?

A WTO dispute settlement panel faced exactly this situation in *EC – IT Products*. That dispute concerned the tariff treatment of FPDs that were capable of receiving and reproducing video signals both from automatic data-processing machines (e.g. computers) and other sources (e.g. DVD players). So, were they subject to the 12 per cent bound duty for video monitors or to the duty-free concession for computer monitors?

The panel once again applied the same interpretive approach taken by the Appellate Body in *EC – Computer Products*. Looking at the words

actually used in the relevant parts of the European Communities' schedule, the panel acknowledged that the schedule explicitly excluded from duty-free treatment FPDs that were solely capable of receiving signals from sources other than automatic data processing machines. However, the FPDs at issue were capable of receiving signals from multiple sources, including automatic data-processing machines. Thus, the panel held that the European Communities could not deny the duty-free treatment to FPDs that were units of automatic data-processing machines simply because they were also capable of displaying signals from other sources. Thus, although the products and their multifunctionality were new, some of them nevertheless fitted into an existing category of the European Communities' schedule, and that category governed the applicable tariff rate.

These disputes show that new products do not necessarily fall outside of the scope of members' scheduled concessions. Rather, the proper tariff treatment of new products, including new digital and technological products, depends upon a proper interpretation of the scope of the relevant scheduled concessions as well as the applicable provisions of the relevant treaty or treaties.

Other technology-related issues have also arisen in WTO dispute settlement relating to digital methods of transmission or delivery in trade in services. According to the GATS, services trade is affected through one of four different methods or "modes" (see endnote 19 for a definition of the four modes). As the internet has increasingly overcome the physical barriers of time and distance and enabled international communication, engagement, and transaction with unprecedented ease and speed, and through an ever-increasing range of devices, disputes have arisen about the extent to which the provision of services over the internet, as opposed to more traditional technologies such as the telephone or the fax machine, are covered by members' services schedules. For example, in *US – Gambling*, it was found that gambling services provided over the internet were covered by a commitment in the United States' services schedule concerning the provision of gaming services. In that same report the panel noted that "this is in line with the principle of 'technological neutrality', which seems to be largely shared among WTO Members".⁴⁰ This means that the technologies used to enable Mode 1 trade have no bearing on whether the service(s) in question are covered by WTO rules. In other words, a service delivered over the internet is, for WTO purposes, to be treated no differently than the same service provided over the telephone – for example, the provision of French language lessons from France to students in, for

example, Brazil, is to be treated the same regardless of whether the lessons are provided over the phone or via an internet voice call (WTO, 2004).

Accordingly, although new technologies are making the provision of services across borders both easier and more common, the mechanism or method by which such services are provided should not have an impact on their treatment under WTO law. This provides meaningful predictability and stability. It means that, although the constantly changing digital environment means that services are continually being provided in new and innovative ways, their provision continues to be governed by the framework of rules and commitments made by members upon their entry into WTO.

(c) International organizations

As discussed in the preceding subsections, unilateral measures undertaken by governments may not be sufficient to fully capitalize on the opportunities offered by digital innovation and digital trade. In particular, there is scope for international cooperation and multi-stakeholder engagement at the supranational level. This subsection provides an illustrative list of key initiatives undertaken by other multilateral organizations to help governments realise the benefits and address the challenges related to digital trade.

While the focus of this section is on multilateral programmes, regional actors also play an important role. Regional development banks, such as the African Development Bank (AfDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), and the Inter-American Development Bank (IADB), as well as regional organizations like the African Union (AU), the Asia-Pacific Economic Cooperation (APEC), the Association of Southeast Asian Nations (ASEAN), and the various regional organizations active in Latin America, all have programmes in place in one area or another to accompany governments in their efforts to address the risks and reap the benefits of digital trade.

(i) Facilitating investment in human capital and addressing knowledge gaps

As already discussed in Section D.2(a), the lack of adequate infrastructure, coupled with low levels of human capital, is one of the key challenges faced by developing countries in reaping the gains from digital trade.

Several international organizations have developed programmes to help developing countries' governments build the skills needed for individuals and businesses

to maximize the benefits of digital trade, including the Internet Society (ISOC), the International Trade Centre (ITC), the International Telecommunications Union (ITU), the United Nations Commission on International Trade Law (UNCITRAL), UNCTAD, the Universal Postal Union (UPU) and the World Bank, as well as UN regional commissions. The ITU Academy, for example, provides face-to-face and online courses to equip individuals with the ICT skills they need to find their way around a fast-evolving digital environment. UNCTAD's TrainForTrade programme is another initiative that offers face-to-face technical assistance and skills training, as well as distance-learning courses to developing countries in multiple languages, customized according to the specific needs of the country. The programme also supports developing countries in formulating e-commerce and investment policies and implementing institutional frameworks for e-commerce-related issues at the national level.

Some programmes, such as the "Digital Skills for Decent Jobs for Youth" campaign launched in June 2017 by the International Labour Organization (ILO) in partnership with the ITU, focus on young people. The campaign aims to forge partnerships with the aim of mobilizing investment to equip 5 million young people with digital skills conducive to decent jobs by 2030.

The lack of information about market access and potential opportunities is another major challenge faced by developing countries in the context of digital trade. In view of this, many international organizations have undertaken initiatives to offer technical assistance and policy advice to developing countries, in addition to sharing information about best practices and trends in e-commerce.

UNCTAD, for example, launched a comprehensive multi-stakeholder initiative called "eTrade for all" in July 2016 to address existing knowledge gaps and maximize synergies between developing countries, donors and partners. Under this initiative, 29 international organizations (including the WTO) have come together to promote greater transparency in the supply of capacity-building efforts in support of eTrade readiness. The "eTrade for all" online platform serves as a one-stop information hub for developing countries to identify potential sources of assistance, connect with potential partners and benefit from currently some 25 different "development solutions", related, for example, to infrastructural support, skills-building, payment solutions, regulatory frameworks and trade facilitation (<https://etradeforall.org>).

Similarly, the WCO has launched an e-commerce web corner to serve as a single reference point for

all e-commerce related information including policy support, technical assistance and capacity-building (see <https://etradeforall.org/developmentsolution/e-commerce-web-corner-world-customsorganization/>).

Another key initiative in this area is the Rapid e-Trade Readiness Assessments of Least Developed Countries implemented by UNCTAD to assist LDCs in assessing their e-commerce readiness by identifying critical readiness gaps in different policy areas (including ICT infrastructure, electronic payment systems, trade logistics, access to finance and skills development), and proposing concrete actions to address the gaps through collaborative public and private partnerships (see <http://unctad.org/en/Pages/Publications/E-Trade-Readiness-Assessment.aspx>). As of May 2018, seven such assessments had been completed,⁴¹ three of which were funded through the Enhanced Integrated Framework (EIF), a multilateral partnership dedicated to assisting LDCs. The EIF's institutional and productive capacity-building projects also assist participating LDCs in developing e-commerce strategies and small infrastructure for online business and governance, with digital/e-commerce skills training being in many cases an integral part of such projects. Finally, the EIF is working with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) to support the implementation of an Asia-Pacific paperless trade framework agreement through legal analysis and capacity-building.

Finally, the ICT Policy Review Programme (ICTPR), implemented by UNCTAD, serves as a broad-based initiative to offer technical assistance, strategic advice and diagnostics on e-commerce-related issues to governments (see http://unctad.org/en/Pages/DTL/STI_and ICTs/ICT4D-Policies.aspx). The ICTPR aims to encourage inclusive policy dialogue by identifying bottlenecks and proposing solutions to reform ICT policies at the national level.

Various regional actors have also launched technical assistance initiatives to build digital skills at the regional level. The African Union, for example, has developed, as part of its Agenda 2063 framework – which, among other things, aims at developing ICT – a programme to support digital entrepreneurship and promote integration of ICT in education and training. ASEAN, for its part, adopted a work programme on e-commerce for the period 2017 to 2025, which includes human capacity development programmes on digital technologies and e-commerce. Another example is the IADB, which organizes training activities for customs officials and regional agencies on digital certification and electronic single windows, and is one of the driving

forces behind the ConnectAmericas Platform, a free social media platform that aims at facilitating firms' internationalization through online learning activities, information sharing and networking opportunities.

(ii) Addressing challenges related to trade facilitation and ICT infrastructure

Several international organizations are actively involved in initiatives that aim to support governments in using digital technologies to reduce the cost of doing business by simplifying and standardizing trade-related procedures, in particular customs procedures and the logistics of cross-border e-commerce.

One of the key programmes in this area is the UNCTAD Automated System for Customs Data (ASYCUDA), which was initiated in the early 1980s to automate the operations of customs administrations (see <http://www.asycuda.org/>). The main objective of the programme is to facilitate trade by strengthening the customs administrations' operational capacity to carry out their fiscal and control missions through automation. The ASYCUDA software has contributed to modernizing and streamlining customs transit and clearance procedures in more than 90 countries worldwide.

Another key actor in this field is the World Bank through its Trade Facilitation Support Program, which supports countries in implementing the WTO's TFA (see <http://www.worldbank.org/en/programs/tradefacilitation-support-program>). The ITC has also set up a trade facilitation programme to promote the inclusion of business perspective in trade facilitation reforms through the enhancement of public-private dialogue and increased collaboration between key stakeholders (see <http://www.intracen.org/itc/trade-facilitation-programme/>). Among the ITC's clusters of intervention, the modernization and automation of cross-border procedures aims to respond comprehensively to the needs of businesses – including e-traders – through enhanced transparency and improved access to information and documentation. The ITC also assists MSMEs in overcoming physical and procedural barriers to online commerce by strengthening their capacity to meet border requirements.

The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT), for its part, has issued 40 recommendations to facilitate cross-border trade and electronic business by simplifying, standardizing and harmonizing trade-related procedures and information flows. Recommendation 26, for instance, encourages the “use of interchange agreements between commercial parties using

Electronic Data Interchange (EDI) for international commercial transactions”. The same recommendation also includes The Model Interchange Agreement for the International Commercial Use of EDI to “ensure the harmonization of interchange agreements in international trade and to develop an internationally accepted version for optional use”. Many of these recommendations are now international standards of the International Organization for Standardization (ISO).

In addition, challenges raised by the parcellization of trade (see Box C.3) led the World Customs Organization (WCO) to establish a Working Group on E-commerce in July 2016 to develop proposals for practical solutions to facilitate the clearance of low value shipments, including duty/tax collection mechanisms and control procedures. A recommendation that outlines guiding principles to simplify clearance of such shipments while ensuring appropriate revenue collection was adopted in December 2017, and a framework of standards is being developed with the aim of providing a globally harmonized approach to ensure the speedy delivery of parcels across borders.

Other projects are specifically aimed at supporting the development of ICT infrastructure in developing countries. The World Bank's Transport and ICT Global Practice, for example, helps governments harness and promote new and innovative technologies through infrastructure lending, technical assistance and advisory services (see <http://www.worldbank.org/en/topic/transport/brief/connections>). Overall, more than three-quarters of World Bank projects include an ICT-related component. The Telecommunication Development Sector programme of the ITU is another example of a programme on ICT infrastructure, which aims at fostering international cooperation in the delivery of technical assistance and in the creation, development and improvement of telecommunications and ICT equipment and networks in developing countries (see <https://www.itu.int/en/ITU-D/Pages/default.aspx>).

Finally, a number of regional organizations, as well as the various regional development banks, have programmes in place to facilitate trade and support the development of infrastructure, many of which with a digital component. The APEC Internet and Digital Economy Roadmap, for example, identifies the development of digital infrastructure, the promotion of interoperability, and the achievement of universal broadband access as key focus areas. The IADB, for its part, actively supports the use of digital technologies as part of its trade facilitation activities (through, for instance, the promotion of electronic single windows).

(iii) Facilitating a favourable legal and regulatory framework

The lack of a robust legal and regulatory framework for the governance of digital trade can not only hinder technological advances; it can also pose serious challenges for consumers and businesses alike by increasing the risk of fraud, cybercrime and abuse of privacy. International organizations can play a crucial role in fostering technological innovation while mitigating such risk by helping countries develop a legal environment that promotes secure online business.

UNCTAD's E-Commerce and Law Reform Programme, for example, offers developing countries access to expert reviews of e-commerce legislation and provides expert advice to policymakers regarding effective laws governing e-commerce. Areas covered under this programme include consumer protection, cybercrime, data protection and privacy, intellectual property and electronic signatures. The ITU, for its part, supports the development of transparent and forward-looking legal and regulatory frameworks to stimulate ICT investment and promote universal, ubiquitous, affordable and secure access to ICTs through its Infrastructure, Enabling Environment and E-Applications Department.

Given the ever-evolving nature of digital trade, a number of international organizations have taken steps to discuss, conceptualize and implement suitable frameworks for regulation and governance of various aspects of digital technologies and digital transactions. UNCITRAL, for example, which is responsible for formulating modern and harmonized rules on commercial transactions, has developed Model Laws on Electronic Commerce and on Electronic Transferable Records, which now provide the basis for national legislation in over 150 jurisdictions across 70 countries. The UNCITRAL Model Law on Electronic Commerce was the first legislative text to adopt the fundamental principles of non-discrimination, technological neutrality and functional equivalence that are widely regarded as the founding elements of modern electronic commerce law (UNCITRAL, 2018).⁴² Building on the UNCITRAL Model Laws on Electronic Commerce and on Electronic Transferable Records, the United Nations Convention on the Use of Electronic Communications in International Contracts aims to facilitate the use of electronic communications in international trade by assuring that contracts concluded and other communications exchanged electronically are as valid and enforceable as their traditional paper-based equivalents. Additionally, the UNCITRAL Secretariat offers technical assistance and expert advice to

lawmakers in drafting and reviewing legislation based on UNCITRAL texts.

Another example is the World Economic Forum (WEF)'s Digital Trade and Cross-Border Data Flows project, which leverages public-private collaboration to define and implement digital trade policy frameworks (<https://www.weforum.org/projects/digital-tradepolicy>). This project is closely linked to the WEF's Centre for the Fourth Industrial Revolution and aims to steer and shape policy developments related to e-commerce, generating global thought leadership and developing practical solutions to advance inclusive growth and sustainable development in digital trade (see <https://www.weforum.org/centre-for-the-fourthindustrial-revolution>).

In the area of trade finance, the International Chamber of Commerce (ICC) Banking Commission has established a working group to identify strategies to overcome the challenges of digitalizing trade finance by evaluating ICC rules to assess their "e-compatibility", develop a set of minimum standards for the digital connectivity of service providers, and examine the practical issues related to the legal validity of data and documents in digitalized form.

The rising interest of businesses and governments in blockchain technology has also led some organizations, such as ISO, to set up new initiatives to explore legal and regulatory issues related to the implementation of this technology. A new ISO technical committee consisting of experts from over 30 countries was established recently to study the priority areas for standardization and develop future standards to "stimulate greater interoperability, speedier acceptance and enhanced innovation in [the] use and application" of blockchain technology.

In addition, various international organizations, such as the United Nations (UN), the OECD and the WCO, have adopted resolutions and issued recommendations and guidelines to help countries develop regulatory frameworks in specific areas such as consumer protection, data privacy and cybersecurity. For instance, the Guidelines for Consumer Protection in the Context of Electronic Commerce, approved on 9 December 1999 by the OECD Council, are designed to help ensure that consumers are no less protected when shopping online than they are when they buy from their local store or order from a catalogue. By setting out the core characteristics of effective consumer protection for online business-to-consumer transactions, the guidelines are intended to help eliminate some of the uncertainties that both consumers and businesses encounter when buying and selling online.

In the area of data privacy, the OECD's Guidelines on the Protection of Privacy and Transborder Flows of Personal Data represent a consensus on basic principles which can serve as the basis for national legislation to be adopted at the country level. These guidelines aimed to harmonize privacy legislation across different countries, preventing undue barriers to the cross-border flows of data and ensuring that there is no unfair discrimination against data subjects. The UN, for their part, adopted a first resolution on the right to privacy in the digital age in 2013, which has been followed by several others since then. The resolutions underscore that any legitimate concerns states may have with regard to their security should be addressed in a manner consistent with obligations under international human rights law. The resolutions also express concern about the sale of personal data for commercial purposes without the individual's consent. In 2015, UN member states went one step further by appointing a special rapporteur on the right to privacy, responsible for gathering relevant information, including on international and national frameworks, national practices and experience, to study trends, developments and challenges in relation to the right to privacy, and to make recommendations (HRC, 2014).

The need for international cooperation to enhance cybersecurity is widely accepted and has given rise to a large number of initiatives in different fora.⁴³ Of particular importance is the work that has taken place in the United Nations Governmental Groups of Experts on Developments in the Field of Information and Telecommunications in the Context of International Security ("UN GGE"), the first of which was established in 2004. The mandate of the UN GGE was to identify existing and potential threats arising from the use of information and communication technologies and possible cooperative measures to address such threats. The UN GGE reports issued in 2013 included specific recommendations with respect to: (i) non-legally binding norms rules and principles for responsible behaviour of states;⁴⁴ (ii) confidence-building measures; (iii) international cooperation and assistance in cyberspace security and capacity-building; and (iv) how international law applies to the use of ICTs. The GGE process reached an impasse in 2017 when the fifth UN GGE was unable to reach consensus on a report, mainly because of disagreement concerning the application of how certain international laws⁴⁵ applies to cyberspace.

Various other UN bodies and organizations are also actively involved in issues related to cybersecurity. The Economic and Social Council (ECOSOC), one of the principal organs of the UN, has been

dealing increasingly with cybercrime. The issue of cybersecurity has also been discussed in the UN Congress on Crime Prevention and Criminal Justice (UNCPCJ), which plays a major role in international standard-setting and policy-making in crime prevention and criminal justice. The work of the UNCPCJ resulted in the adoption by the UN General Assembly of a resolution calling for an open-ended intergovernmental expert group to study the problem of cybercrime and international responses to it. The report was produced by the UN Office on Drugs and Crime (UNODC) in 2013 and led to the launch of the UNODC Global Programme on Cybercrime. This programme is intended to assist member states in their struggles against cyber-related crimes through capacity-building and technical assistance. Another UN organization active in this field is the ITU, which has developed a Global Cybersecurity Index (see <https://www.itu.int/en/ITU-D/Cybersecurity/Pages/GCI.aspx>), and in May 2017 it launched the Global Cybersecurity Agenda (GCA – see <https://www.itu.int/en/action/cybersecurity/Pages/gca.aspx>), a framework for international cooperation on cybersecurity.

Another important initiative is the Resolution of the Policy Commission of the WCO on the Guiding Principles for Cross-Border E-Commerce, which outlines the guiding principles for cross-border e-commerce on issues such as risk management, safety and security, and legislative frameworks. The Resolution aims to help customs and other government agencies, businesses, and other stakeholders in the cross-border e-commerce supply chain to understand, coordinate and better respond to the current and emerging challenges.

Some regional organizations have also launched initiatives to coordinate and support regional efforts to develop a robust legal environment to promote digital trade. The APEC Electronic Commerce Steering Group (ECSG), for example, coordinates e-commerce activities for APEC and promotes the development and use of e-commerce by supporting the creation of legal, regulatory and policy environments in the APEC region that are predictable, transparent and consistent. The ASEAN, for its part, has made modernizing the e-commerce legal framework and enhancing the security of electronic transactions two of the key objectives of its 2017-2025 work programme on e-commerce. As for the African Union, in 2014 it adopted the African Union Convention on Cyber Security and Personal Data Protection to create a legislative framework for cybersecurity and data protection in the African region.

(iv) Competition-related issues

As discussed in Section D.2(c), the cross-border activities of digital firms can result in spill-overs, for example, in the case of varying stances across different jurisdictions towards abuses of dominant positions and their impact across national markets (Epstein and Greve, 2004).⁴⁶ Concerns regarding such potential spill-overs form the rationale for the work of the International Competition Network (ICN), the OECD, UNCTAD and other international organizations (including also WIPO in the context of its Development Agenda and, in the past, the WTO) active in the field of competition policy (Anderson et al., 2018a). These organizations have already promoted a significant degree of convergence in national competition policies generally, through their extensive and informative analytical, policy development and advocacy work (Hollman and Kovacic, 2011).⁴⁷

While international coordination in the more specific subject area of competition policy as it relates to digital markets is, perhaps, in a relatively early phase, some WTO members have already recognized the importance of cooperation in this area⁴⁸ and called for forward-looking discussions in relevant international fora.⁴⁹

(v) Intellectual property-related issues

International regulatory cooperation

While the existing technology-neutral intellectual property rules in place in the 1990s provided, for the most part, a robust regulatory environment for the digital exchange of licenses and protected subject matter, the operation of the digital technologies making up the internet, and the latter's transnational nature, raised a number of specific problems for intellectual protection. Some of the more immediate issues quickly triggered regulatory responses at the international level which have now become widely accepted standards, including through RTAs (see Section D.3(d)).

The protection of well-known trademarks

It has long been established in trademark law that particularly famous trademarks should enjoy special protection, and the TRIPS Agreement further consolidated the conditions and contours of this trademark protection, not only broadening the scope of this protection to include service trademarks, but also clarifying that, when determining whether a trademark is "well-known", besides its actual use, members should also take into consideration how well-known

the trademark is in the relevant commercial sector, including through advertising. However, despite these clarifications, considerable differences in the interpretation prevailed in different jurisdictions about the definition of the term "well-known" trademarks.

These differences were put into sharp focus when, after the fall of the "Iron Curtain" and the dissolution of the Soviet Union, a number of new market economies emerged which enacted trademark laws and established their own registration authorities. It was not uncommon during that period for fortune-seekers to register famous trademarks like "Dior" or "Cartier" in order to extract money from the true proprietors when the latter tried to get a foothold in the same market (Kur, 2013). This situation was exacerbated by the global reach of the newly established internet, which meant that situations permitted under different national regulatory systems could – and often did – collide, thereby multiplying multi-territorial conflicts.

This resulting need for international cooperation to harmonize the interpretation of the term "well-known" led to discussions at the WIPO Standing Committee on Trademarks, Industrial Designs and Geographical Indications (SCT), which concluded with the adoption of the Joint Recommendation Concerning Provisions on the Protection of Well-Known Marks in 1999. These non-binding joint recommendations contain detailed provisions for the determination of a "well-known" trademark, taking into account the internet phenomenon, and establish remedies for conflicts between well-known marks and other marks, business identifiers and domain names.

The internet and trademark use

The global and borderless nature of the internet also challenged the concept of trademark use, which, in trademark law, is significant in determining whether use requirements for registration have been fulfilled, whether distinctiveness has been acquired, and what constitutes infringement in a particular jurisdiction. Driven by increasingly pressing questions on how to resolve these inherently international challenges, discussions in multilateral fora have sought to accelerate the development of international harmonized principles (Croze, 2000) in this regard. The resulting discussions aimed to harmonize the interpretation and meaning of "trademark use" which was not specifically dealt with in the existing legal frameworks of the time (the Paris Convention and TRIPS Agreement) and was causing increasing difficulties for trademark owners with the propagation of internet and the rise of new business models and online commerce. The resulting

Joint Recommendation Concerning Provisions on the Protection of Marks, and Other Industrial Property Rights in Signs, on the Internet (2001) was established in order to help the authorities and courts involved in such conflicts and in all other questions arising from the contradiction between the principle of territoriality of rights and the global nature of the Internet (WIPO, 2004).

The 2001 Joint Recommendation contains detailed provisions that allow members to determine whether the use of a sign on the internet can be considered as use in their territory by providing a list of relevant factors that allow the identification of whether such use can constitute a “commercial effect”.⁵⁰ It also establishes best practice for avoiding conflicts of rights-holders of identical or similar rights granted in different countries and their use over the internet. It further provides that remedies should be limited, as far as possible, to the territory in which the right is recognized, and they should only be available if the allegedly infringing use of the sign can be deemed to have taken place in that territory.

While these recommendations were conceived as non-binding “soft law” rules they now enjoy widespread factual adherence, and compliance with their substance is now frequently included in the intellectual property obligations in bilateral international treaties.

The “Internet Treaties”: copyright and neighbouring rights

The rules governing copyright and neighbouring rights were established by the Berne Convention, the Rome Convention and the TRIPS Agreement, signed in 1994.

These normative bodies were conceived in the early stages of internet proliferation, and even though their provisions remain technology-neutral, there were big concerns from countries with strong cultural and creative industries about how these rules could apply for enforcing IPR in the digital environment.

The principal purpose of the “Internet Treaties” – the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty – was to adapt international rules for the protection of copyright and the rights of performers and producers of sound recordings to the digital revolution, in particular, the distribution of copyright material over the Internet (WTO, 2015a).

The WIPO Copyright Treaty and the WIPO Performances and Phonogram Treaty do not constitute amendments to the Rome Convention or the Berne Convention respectively, nor are they part of

the TRIPS Agreement. They are independent treaties that build on the provisions of the aforementioned agreements and further clarify the rights conferred, for example the rights of reproduction and making available for application in the digital environment, among others.

These updates served at the time of adoption to support enforcement actions against emerging forms of piracy, such as mass pirated optical disk production, and the use of early versions of peer-to-peer (P2P) technology to make unauthorized copies of copyrighted material available online (Wilson Denton, 2015).

Technical assistance

Beyond the regulatory responses described above, WIPO is actively providing technical assistance to help countries harness the use of digital technologies in the IP area and enhance their participation in the global innovation economy.

WIPO’s programme of assistance to IP offices helps such offices in developing countries and LDCs to deliver better services to their stakeholders through efficient automated and standardized business processes for IP administration, online services, including search, registry and filing systems, and integration into regional and international systems to enable the electronic exchange of data and documents.

(vi) Supporting MSME participation in digital trade

As discussed in Section D.2(e), digital trade has opened up a world of opportunities for MSMEs in terms of increased access to international markets. However, given their small scale of operation and limited skills, MSMEs, especially in developing countries may require technical assistance and advisory services to maximize the potential benefits of digital trade.

In view of this, some international organizations, such as the ITC, have actively focused on supporting the participation of MSMEs in digital trade. ITC’s E-Solutions Programme, for example, aims to facilitate online trading for MSMEs through initiatives such as creating a common collaborative structure for technology and services. In this way, MSMEs are able to share the costs of exporting goods, handle foreign payments and generate awareness in foreign markets. The programme also helps countries to build an international legal structure and international logistics to reduce barriers to e-commerce. Finally, it promotes market access for MSMEs through special

events, promotional activities and partnerships with international platforms. In association with the World Bank, ITC has also undertaken a Virtual Market Places (VMPs) project which aims to unlock the untapped economic growth potential of MSMEs in the Middle East and North Africa region in order to generate employment and more inclusive social and economic development. This project supports MSMEs in adopting new business models to improve their competitiveness and enable them to penetrate new markets.

Another example is the “Enabling E-commerce” initiative, launched by the WTO, in partnership with the WEF and the Electronic World Trade Platform (eWTP), during the 11th WTO Ministerial Conference in Buenos Aires in December 2017. This initiative aims to bridge the gap between global e-commerce policy and practice by facilitating dialogue on the practical challenges faced by MSMEs.

The Easy Export Programme undertaken by the Universal Postal Union (UPU), for its part, capitalizes on national postal infrastructure to develop a simplified and harmonized export service for MSMEs. The UPU Easy Export Programme is adapted from *Exporta Fácil*, a postal export project implemented in Brazil and other Latin American countries. The UPU also provides support in legal, regulatory, and technical framework and sets the global postal strategy, regulations, and standards.

It is often argued that MSMEs are disproportionately affected in the international trade arena by, among other things, a lack of access to information (ITC, 2016). They are often unaware of potential foreign markets and do not have the resources to navigate sometimes complex trading procedures. Small business owners often lack the time and in house expertise to deal with trade roadblocks, which puts them at a disadvantage and may even prevent them from participating in world trade.

Several international organizations have launched initiatives to redress this situation and to improve access to trade related information. For example, the WTO makes publicly available all notified information through different platforms, such as the “Integrated Trade Intelligence Portal” (WTO, 2018a), which provides frequent updates on a wide range of trade measures, including tariffs and regulatory changes to standards. The Transparency in Trade (TNT) initiative (TNT, 2018), for its part, is a partnership by UNCTAD, the AfDB, the ITC, and the World Bank that aims to facilitate the collection of tariffs and non-tariff measures and other trade data, and at providing free and open access the data collected. In December

2017, the ITC, UNCTAD and the WTO also launched the Global Trade Helpdesk, an online portal with relevant and up-to-date market information to support MSMEs to make fully informed trade and investment decisions that could lead to greater international trade activity. The Global Trade Helpdesk provides a unique entry point to existing trade-related information.

(vii) Promoting digital inclusion and making digital trade an engine of development

As discussed in Section D.2(a), one of the most important dimensions of the digital divide is that between developing countries that are not very technologically advanced and developed countries that are. Bridging the digital divide is one of the key objectives of the UN SDGs, which were launched in 2016 and have been guiding multilateral work in this area since then. Goal 9.C, in particular, calls on the international community to “significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020”. In view of the critical importance of promoting digital inclusion, the Aid for Trade initiative has made digital connectivity and inclusiveness the main focus of its recent work. The 2017 *Aid For Trade at a Glance* publication (OECD and WTO, 2017) examined how and why connectivity is critical for inclusiveness and development, with a view to informing policy discussions and helping governments, donors and the private sector to focus their development efforts.

Various international organizations are active in this area. In 2016, for example, the World Bank launched a multi-donor trust fund, the Digital Development Partnership, based on the findings and recommendations provided by its World Development Report (World Bank, 2016). The programme supports developing countries in strengthening analogue complements to digital technologies, such as regulations that create a vibrant business climate and skills that let firms leverage digital technologies to compete and innovate.

In association with UNCTAD’s “eTrade for all” initiative, the World Bank has undertaken an “eTrade for Development” programme to assist developing countries in expanding digital entrepreneurship, to diagnose a country’s performance on e-trade and assess its main limitations, to improve developing countries’ regulatory environments for digital markets based on international best practices, and to facilitate the adoption of customs procedure and logistics condition to reduce costs related to the movement of goods through e-commerce.

Some organizations, such as the Food and Agriculture Organization (FAO), have also undertaken digital inclusion initiatives to address the barriers to mobile internet adoption through infrastructure and policy, affordability, digital literacy and availability of local content. FAO's "Mobile Apps for Local Content" project, for example, focuses on the development of four apps that will help improving agricultural services and availability of local content. It aims to provide easy and affordable access to useful data, information and statistics to the rural poor. This project is part of a broader initiative that leverages the knowledge of FAO and its strategic partners in the mobile world, promoting digital inclusion for smallholders and family farmers.

(viii) Supporting collection and dissemination of reliable ICT statistics

In order to help economies to develop and implement better policies, some international organizations are supporting the collection of reliable statistics on the access to and use of ICTs and their impact on development. In association with UNCTAD's "eTrade for all" initiative, the International Telecommunications Union (ITU) has undertaken an ICT statistics programme that offers developing countries support in collecting and disseminating data about ICTs. The programme offers technical support for data collection and training for staff of National Statistical Offices and other national institutions responsible for ICT statistics and household surveys.

In a similar vein, the "Partnership on Measuring ICT for Development" is an international, multi-stakeholder initiative that was launched in 2004 to improve the availability and quality of ICT data and indicators, particularly in developing countries. The Partnership helps developing countries to collect ICT statistics, particularly through capacity-building and hands-on training for national statistical offices, and collects and disseminates information society statistics. The Partnership's work is coordinated by a steering committee made up of the ITU, UNCTAD and the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics.

The importance of reliable data to foster informed and evidence-based policy-making also led the Group of Twenty (G20) to initiate work on ways to measure digital trade. In 2017, the German Presidency tasked the OECD, the UNCTAD, the World Bank and the WTO to work together to identify opportunities, challenges and the way forward in the measurement of digital trade. Discussions on this issue now take place in the context of the G20 Trade and Investment Working Group (TIWG). The G20 Digital Economy

Task Force under the Argentinian Presidency in 2018 also began work to develop a toolkit for measuring the digital economy.

(d) Regional trade agreements

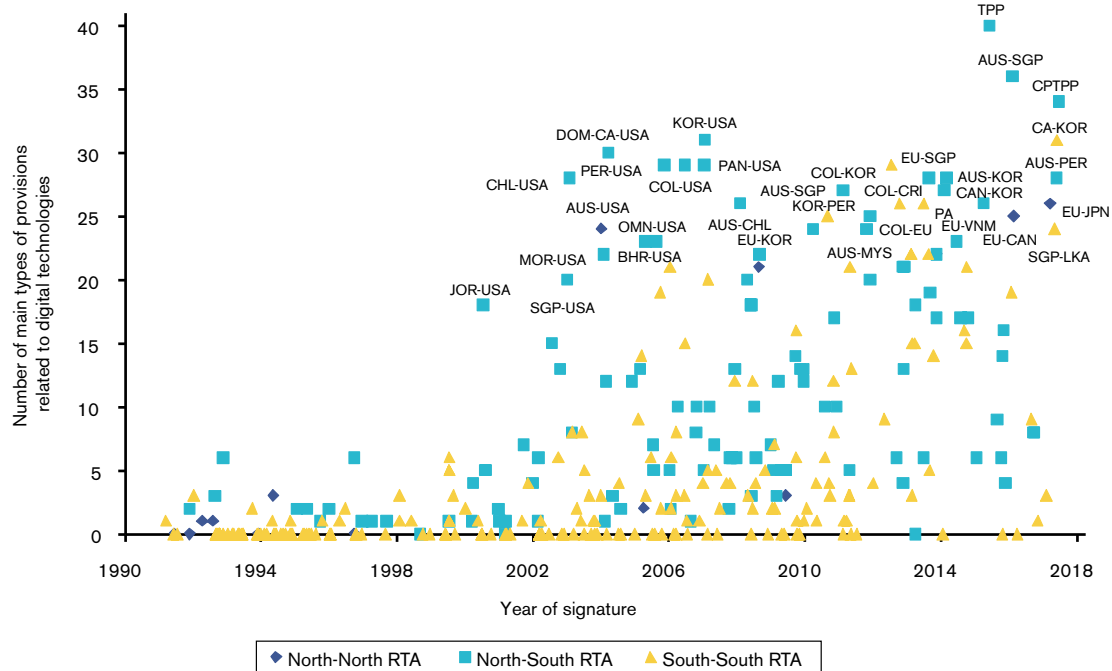
RTAs have often been dubbed laboratories in which some economies establish new types of provisions in order to address recent trade-related issues and challenges. A detailed analysis of 362 RTAs, including 286 agreements currently in force and notified to the WTO (as of August 2018), shows that issues related to digital technologies are explicitly found in different chapters of an increasing number of RTAs – currently 217.⁵¹ Although, the inclusion of such provisions is not a recent phenomenon, the number and scope of provisions related to digital technologies incorporated in a given RTA have tended to increase in recent years, as highlighted in Figure D.2. These provisions can be found throughout the agreement, and not only in the chapter on e-commerce, highlighting the complexity of the different issues related to digital technologies and trade. These issues can be broadly grouped as related to: (i) trade rules and market access; (ii) telecommunications regulatory framework; (iii) specific digital regulatory challenges; (iv) intellectual property; (v) electronic government management and (vi) cooperation.

While some provisions related to digital technology clarify certain existing provisions and/or commitments established under the WTO, other provisions expand commitments or establish new ones (Burri, 2017; Monteiro and Teh, 2017; Wu, 2017; Tuthill and Sherman, 2008). In addition, provisions related to digital technologies often complement other relevant provisions found in RTAs, even though they do not make explicit reference to digital technologies, as highlighted in Section D.3(b) in the case of the WTO agreements. Overall, provisions related to digital technologies remain particularly heterogeneous, sometimes specific to a single or couple of RTAs.

(i) Trade rules and market access in relation to digital trade

A broad set of provisions on digital technologies found in RTAs is explicitly related to trade rules and market access. As highlighted in Figure D.3, the scope of these provisions ranges from the applicability of WTO and RTA rules to e-commerce, to the non-discriminatory treatment of like digital products, as well as commitments not to impose custom duties on digital products and to liberalize digital trade in services. Other relatively more recent provisions address the cross-border transfer of information by electronic means, the use and location

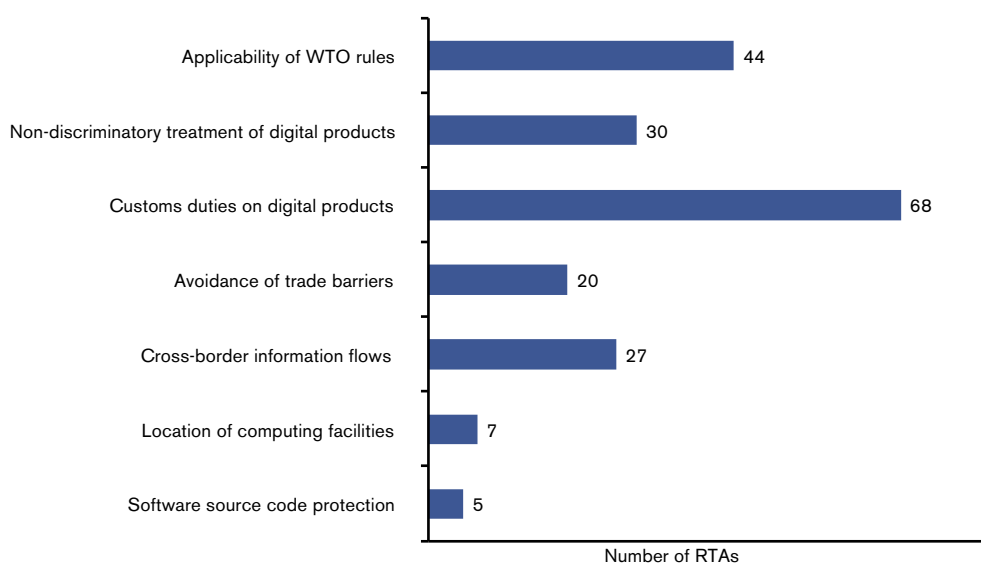
Figure D.2: Evolution of RTAs with provisions related to digital technologies



Source: Updated and extended from Monteiro and Teh (2017).

Note: See Appendix D.1 for the complete list of main types of provisions related to digital technologies in RTAs. Original and amended RTAs are analysed separately.

Figure D.3: Provisions related to digital technologies on trade rules and market access



Source: Updated and extended from Monteiro and Teh (2017).

of computing facilities, and the transfer of and access to software source code.

Applicability of WTO rules to e-commerce

An increasing number of RTAs with an e-commerce chapter include a provision referring to the applicability of WTO rules to e-commerce, which recognizes, as discussed in detail in Section D.3(b), that e-commerce falls within the scope of existing WTO agreements. Although the language of this type of provisions differs across agreements, the two most common provisions specify that the parties recognize (where relevant) the applicability of WTO rules to e-commerce or to measures affecting e-commerce, respectively.

Scope of the e-commerce chapter

Comprehensive e-commerce chapters in RTAs sometimes include provisions specifying their scope, namely measures affecting e-commerce or trade conducted by electronic means. When defining the scope, several RTAs incorporate a provision confirming the applicability of the other chapters to the e-commerce chapter, such as those related to cross-border trade in services, investment, financial services and/or telecommunications.⁵² Generally, e-commerce provisions, especially in so far as they relate to the electronic supply of services, are subject to any relevant reservations for non-conforming measures in annexes (negative list RTAs) or limitations entered in schedules, or unscheduled services (positive list RTAs). While a few agreements confirm that electronic transmissions are considered to be a provision of services, other RTAs explain that the e-commerce chapter has been incorporated without prejudice to the parties' respective views on the question.

A limited number of RTAs explicitly limit the scope of the e-commerce chapter (or some provisions) by excluding certain types of measures from the disciplines therein, such as those related to government procurement, subsidies and taxation. Other excluded measures include those affecting broadcasting and information held by or on behalf of a party or measures related to such information.

Non-discriminatory treatment of digital products

A limited but increasing number of RTAs incorporates specific provisions, often worded differently across agreements, referring to the principle of non-discrimination of digital products. Subject to reservations for non-conforming measures and commitments and limitations scheduled in relation to, typically, the chapters on cross-border trade in

services, investment and financial services, these provisions prohibit a party from adopting measures that accord less favourable treatment to digital products of the other party than it accords to its own like digital products. Most RTAs that incorporate a clause of national treatment of digital products also extend the non-discrimination provisions to the principle of most-favoured-nation treatment, namely the prohibition of measures that accords less favourable treatment to digital products of other parties to the RTA than it accords to like digital products of non-parties to that RTA.

A complementary provision, only found in a couple of relatively recent RTAs, requires each party to endeavour to eliminate any measure not complying with the non-discrimination principle and adopted before the agreement's entry into force that the other party identifies. A related provision further requires the parties to determine, in good faith and in a transparent, objective, reasonable and fair manner, whether a digital product is of the party, of the other party or of a non-party. The parties also commit to cooperate in international organizations and fora to foster the development of criteria for the determination of the origin of a digital product, with a view to considering the incorporation of such criteria into the RTA.

Customs duties on digital products

It is not only in the context of the WTO that countries have agreed not to apply customs duties on digital products. Most RTAs with a specific article or chapter on e-commerce include a provision referring to the practice of not imposing customs duties on electronic transmissions or digital products. The language of this type of provision differs across agreements, ranging from the recognition by the parties of the importance of maintaining the current practice of not imposing customs duties on electronic transmissions, to firmer commitments to not impose any customs duties on electronic transmissions or digital products.

The scope of the practice of not imposing customs duties differs also across agreements. Most provisions apply to digital products by electronic transmission, while others refer more generally to electronic transmissions. Similarly, some provisions refer only to customs duties, while others explicitly cover customs duties as well as fees or charges. Several RTAs further clarify that nothing prevents the parties from imposing (directly or indirectly) internal taxes or charges on digital products delivered electronically or on content transmitted electronically, as long as such taxes or charges are imposed in a manner consistent with the agreement.

A very few other provisions refer explicitly to the WTO Ministerial Decisions on the Work Programme on Electronic Commerce regarding not imposing customs duties on electronic transmissions. Unlike in the WTO where the decision on the moratorium on customs duties on electronic transmissions is renewed at every ministerial conference, the practice of not imposing customs duties on electronic transmissions in RTAs is often a permanent one. In that context, one relatively recent but idiosyncratic provision commits the parties to cooperate to make this practice binding within the WTO framework, with a view to considering its incorporation into the RTA. A related provision further specifies that the parties (may) reserve the right to adjust the practice of not imposing customs duties, consistent with any changes to the WTO Ministerial Decision.

Avoidance of trade barriers faced by e-commerce

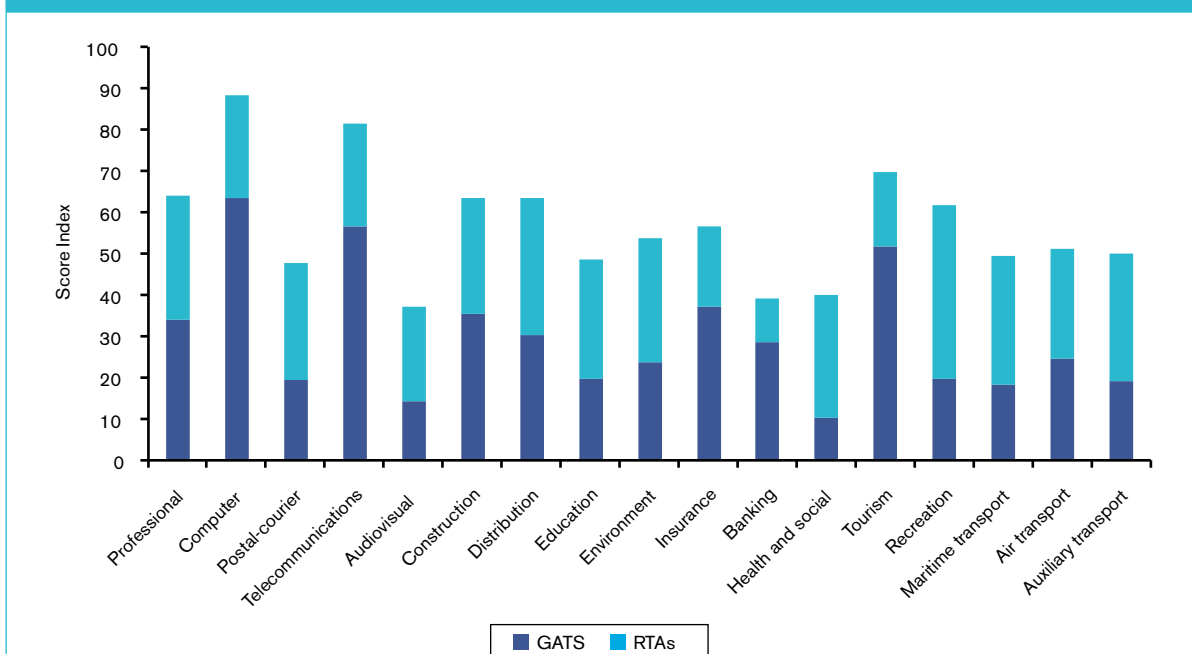
While many RTAs incorporate a provision recognizing the importance of avoiding (unnecessary) barriers to the use and development of e-commerce, a limited number of agreements include specific provisions referring explicitly to (unnecessary) trade barriers faced by e-commerce.⁵³ Aside from the provision recognizing the importance of avoiding unnecessary

barriers to trade conducted by electronic means, a few other provisions, often complementary, call on the parties to the RTAs in question to endeavour to prevent or guard against measures that unduly hinder trade conducted by electronic means.

Liberalization commitments in relation to digital services

As discussed in Section D.3(b), trade in services plays an important role in enabling digital trade. While RTAs tended initially to cover only trade in goods, trade in services has become a major component of RTAs in the last 15 years. Overall, services commitments established under RTAs tend to guarantee greater levels of market access and non-discrimination than under the GATS. As highlighted in Figure D.4, the sectors of telecommunications and computer services attract, overall, the highest levels of bindings in RTAs (Gootiiz et al., 2018; Roy, 2014; Tuthill and Sherman, 2008). Several RTAs go beyond the GATS by expanding the sectoral coverage of commitments or by reducing or eliminating limitations. A number of countries have also, in RTAs, gone beyond their obligations in relation to the Reference Paper on Regulatory Principles on Basic Telecommunications (see also Section D.3(b)(ii)).

Figure D.4: Average sectoral index score for GATS and RTA commitments



Source: Roy (2014) based on Roy and Marchetti (2008).

Note: Based on commitments undertaken by 53 WTO members (counting the European Union as one) on Modes 1 and 3 in 67 services RTAs. The index score is brought within a scale of 0 to 100 for each sector, with 100 representing full commitments (i.e., without limitations) across all relevant sub-sectors. "GATS" reflects the index value for both GATS commitments and services offer in the Doha Development Agenda. "RTA" reflects the index value for a member's "best" RTA commitments across all its RTAs. The score for the European Union commitments is for the 1995 enlargement of the European Union (EU-15).

The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is, to date, the only RTA to create new disciplines on electronic payment card services, requiring the parties to allow the cross-border supply of electronic payment services subject to certain conditions (such as registration with the relevant authorities).

Cross-border information flows

The ability to transfer data across borders by electronic means is often an essential component of trade, including digital trade. A limited number of RTAs includes specific, often idiosyncratic, provisions related to cross-border information flows in the context of e-commerce. These provisions range from the importance of maintaining cross-border flows of information, to cooperation and commitments to allow cross-border electronic transfer of information by electronic means, including personal information.

Besides recognizing the importance of the free flow of information in facilitating trade, including through cooperation, some RTAs commit the parties to endeavouring to refrain from imposing or maintaining unnecessary barriers to electronic information flows across borders. A few other more recent and specific provisions require the parties to allow the cross-border transfer of information by electronic means, including personal information, for the exercise of the business of a covered person, while recognizing that the parties may have their own regulatory requirements concerning the transfer of information by electronic means.

In parallel, an increasing number of RTAs include provisions on the cross-border transfer of financial information by electronic means. The provisions, which prohibit the adoption of measures preventing the processing of financial information, including transfers of data by electronic means, typically confirm that each party conserves the right to adopt or maintain measures to protect personal data, personal privacy, and the confidentiality of individual records and accounts as long as such measures are not used as a means of avoiding commitments. Some of these provisions also refer to the right to require financial service suppliers to obtain prior authorization from the relevant regulator to transfer such information, based on prudential consideration.

Location of computing facilities

Closely related to the issue of free flows of information across borders is that of disciplining data localization requirements. Only a couple of relatively recent RTAs incorporate specific provisions on the

use and location of computing facilities. In particular, the main provision calls on or requires the prohibition of bilateral measures that require service suppliers, investors and investments to use or locate computer facilities in the other party's territory as a condition for the exercise of its business activity. A complementary provision explains, however, that the parties are not prevented from adopting or maintaining measures affecting the use or location of computing facilities in order to achieve a legitimate public policy objective, provided that such measures are not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade.

Software source code protection

Another issue addressed in a couple of relatively recent RTAs refers to the protection of the confidentiality of software source code. Source code refers to the list of programming commands necessary to understand and modify how software works. In that context, the main provision on source code commits each party not to require the transfer of, or access to, software source code owned by a person of the other party, as a condition of the import, distribution, sale or use of such software, or of products containing such software, in their respective area. This commitment is, however, limited to mass-market software or products containing such software, and explicitly excludes software used for critical infrastructure.

A complementary but less common provision further confirms that the parties are not precluded from including or implementing terms and conditions related to the provision of source code in commercially negotiated contracts. The parties are also not prevented from requiring the modification of source code of software necessary for that software to comply with laws or regulations which are not inconsistent with the RTA. Similarly, requirements related to patent applications or granted patents are not affected, subject to safeguards against unauthorized disclosure under the party's law or practice.

(ii) Telecommunications regulatory issues

As discussed previously, telecommunications services, including internet, mobile telephony, and data transmission services, provide the basic infrastructure and transmission capacity enabling the electronic supply of other services and trade in goods and services through digital networks. An increasing number of RTAs includes a chapter or section dedicated to telecommunications, establishing

specific regulatory principles, including with respect to anti-competitive behaviours. These provisions are complemented in some RTAs with specific provisions on the access to and use of the internet, as well as on internet interconnection charge-sharing.

Domestic telecommunications regulatory framework

Provisions on telecommunications regulatory principles found in RTAs usually draw extensively on the provisions of the WTO Annex on Telecommunication and the Reference Paper on Regulatory Principles on Basic Telecommunications. However, in a similar manner to other types of provisions found in RTAs, the scope of these regulatory provisions tends to differ across agreements. Some RTAs offer some enhancements in either substance or clarity over GATS disciplines (Tuthill and Sherman, 2008).

A number of RTAs broaden the scope of the Reference Paper obligations beyond basic telecommunications, to cover all telecommunications services, thereby promoting fair and transparent competition for all forms of wire-based and wireless services, including mobile, satellite and internet delivery, and other internet-based services, unless otherwise specified in the schedule of the party in question to the RTA. Another area in which some RTAs expand on GATS provisions concerns the requirements for major suppliers to provide leased circuit services at “capacity-based, cost-oriented prices”, which goes beyond “reasonable and non-discriminatory” terms and conditions required under the WTO Annex on Telecommunications. Similarly, some RTAs specify the preferred regulatory approach to be taken by authorities, while neither the Annex nor the Reference Paper dictates any particular regulatory approach.

Several other regulatory issues not addressed, at least explicitly, in GATS disciplines have been addressed in a limited but increasing number of RTAs. In particular, some RTAs contain provisions requiring major telecommunications suppliers to lease network portions to other operators, to enable the latter to extend their network and services directly to customers without having to duplicate the existing facilities or to pay call-by-call interconnection fees in order to pass traffic through the dominant operator’s network. A complementary provision related to co-location further requires major suppliers to allow suppliers of public telecommunications transport networks or services to locate on major suppliers’ premises the equipment which is essential for interconnection or access to unbundled network components or facilities.⁵⁴

Other new issues related to the anti-competitive behaviours of major suppliers include number portability and dialling parity. Provisions on number portability guarantee the ability of end-users of public telecommunications services within a territory to retain the same telephone numbers when switching between like suppliers of telecommunications services. Similarly, provisions on dialling parity guarantee the ability of end-users to use an equal number of digits to access a like public telecommunications service, regardless of the public telecommunications service supplier chosen by the end-user. The promotion of reasonable and non-discriminatory access to facilities owned or controlled by major suppliers and needed to supply telecommunications services, including submarine cables, satellites, and poles and ducts, has also been addressed in some RTAs.

International mobile roaming is another relatively more recent issue that has been addressed in a limited number of RTAs. Certain agreements require major suppliers to provide specified services needed to ensure interoperability of roaming on mobile networks. Other relatively more common provisions encourage: (i) cooperation to promote transparent and reasonable rates for international mobile roaming services, including by ensuring that information on roaming rates is accessible to consumers; (ii) minimizing impediments to the use of technological alternatives to roaming; and/or (iii) exchanging information on the retail rates for international mobile roaming services. RTAs with such provisions often also require that a party’s regulated rates and conditions on wholesale international roaming services are provided to the other parties’ telecommunications service suppliers on a reciprocal basis. Such provisions are intended to enable end users to use their home mobile handset or other device for voice, data or messaging services while outside their territory at reasonable cost.

Access to and use of the internet

While some e-commerce chapters recognize the importance of the telecommunications chapter’s article on “access to and use of public telecommunications transport networks or services” in enabling trade conducted by electronic means, a few RTAs include explicit provisions recognizing a set of principles of access to and use of the internet. According to these principles, consumers should be able to access and use the digital products and services they choose, unless prohibited by the parties’ respective laws. Consumers should also be able to run the applications and services of their choice, subject to the needs of law enforcement, as well as be able to connect their choice of devices to

the internet, provided that such devices do not harm the network and are not prohibited by the parties' respective laws. In addition, consumers should be able to have the benefit of competition among network providers, application and service providers, and content providers.

Internet interconnection charge-sharing

The cost distribution between network providers, application and service providers, content providers and internet users may affect, among other things, access to and use of the internet. In that context, only a couple of very recent RTAs, including the CPTPP, incorporate a specific provision related to internet interconnection charge-sharing. This provision recognises that a supplier seeking an international internet connection should be able to negotiate with another party's suppliers on a commercial basis issues, such as compensation for the establishment, operation and maintenance of facilities of the respective suppliers.

(iii) Domestic regulatory framework for e-commerce

Besides provisions related explicitly to international trade rules, an increasing number of RTAs includes provisions addressing regulatory issues with a view to creating an environment of trust and confidence in the development and use of e-commerce. While some

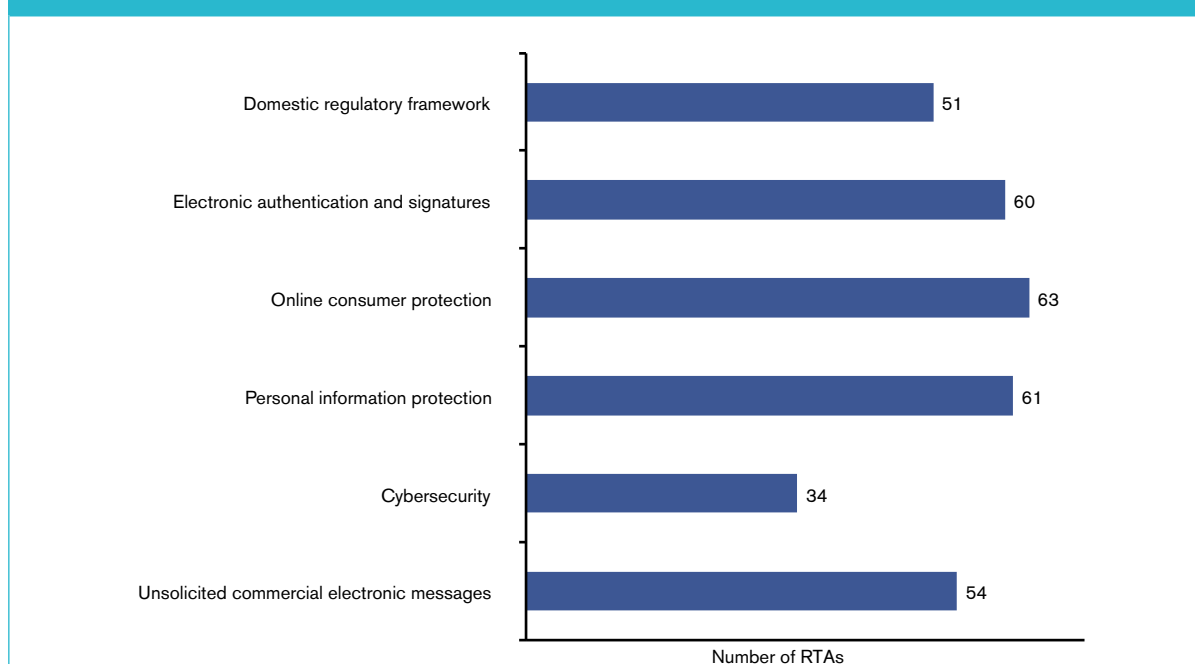
provisions refer to the general domestic regulatory framework, other provisions address, often in a complementary manner, various specific regulatory aspects or concerns related to e-commerce. As highlighted in Figure D.5, some of the most common regulatory issues related to e-commerce covered in RTAs include online consumer protection, electronic authentication and personal information protection. Unsolicited commercial electronic messages and cybersecurity are some of the other issues and concerns addressed in a relatively more limited number of RTAs.

Domestic regulations

A growing number of RTAs include provisions related to the general domestic legal framework in which e-commerce takes place. Similar to other types of e-commerce provisions, the language and scope of these provisions differ significantly across agreements. These provisions range from the recognition of different regulatory principles, such as transparency, interoperability and technological neutrality, to cooperation and commitments to adopt or maintain domestic laws regulating e-commerce and to minimize regulatory burden.

One of the most distinctive provisions refers to the adoption of a general regulatory framework, often referring explicitly to the principles of the 1996 UNCITRAL Model Law on Electronic Commerce.

Figure D.5: Provisions on domestic regulatory framework for e-commerce



Source: Updated and extended from Monteiro and Teh (2017).

As discussed in Section D.3(c), the principles of the UNCITRAL Model Law on Electronic Commerce include, among other things, non-discrimination, technological neutrality and functional equivalence. A couple of more recent RTAs make also an explicit reference to the principles of the 2005 UN Convention on the Use of Electronic Communications in International Contracts.

Electronic authentication and signatures

As explained in Section D.1(c), electronic authentication plays an important role in the promotion of confidence in e-commerce. An increasing number of RTAs include a broad set of provisions explicitly addressing electronic authentication and signatures of transactions. These provisions range from cooperation to commitments to adopt measures related to electronic authentication and promote mutual recognition and interoperability of digital certificates.

A relatively common provision requires the adoption and maintenance of measures permitting participants in electronic transaction to (i) establish before judicial or administrative authorities that their electronic transaction complies with any legal authentication requirement; and/or (ii) determine the appropriate authentication technologies and implementation models. The provision often clarifies that the parties may require certain security authentication standards and certification by an accredited authority for transactions where a high degree of reliability and security is required. Other relevant provisions call on the parties to work towards the mutual recognition of digital certificates and electronic signatures at government level, or to promote the interoperability of digital certificates.

Online consumer protection

Part of the success of e-commerce hinges on consumer trust and the extent to which consumers' rights are adequately protected. In that context, an increasing number of RTAs include various provisions on digital consumer protection, many of which are only found in a couple of recent RTAs.⁵⁵ These provisions range from the importance of digital consumer protection to cooperation to commitments to adopt consumer protection measures and promote fair business practices and cross-border consumer settlement mechanisms.

A limited number of RTAs either calls on the parties to endeavour or requires them to adopt transparent measures to protect consumers engaged in e-commerce from fraudulent and deceptive commercial practices. A complementary but less common provision

further requires the protection for consumers using e-commerce to be at least equivalent to that provided for consumers of other forms of commerce.

A few more recent provisions, found in a couple of RTAs, refer to fair business practices by calling upon or requiring the parties to standardize the information to be provided to consumers in e-commerce, including regarding the terms, conditions of use, prices, additional charges if applicable, and secured forms of payment. Several other provisions, not referring specifically to consumer protection, also establish specific commitments to encourage the adoption by the private sector of self-regulation, including codes of conduct, model contracts, guidelines and enforcement mechanisms (based on international standards). Some of these RTAs also commit the parties to promoting alternative transboundary dispute settlement mechanisms relating to consumer protection in cross-border electronic transactions.

Personal information protection

As discussed in Section D.2(c), a large part of the data being collected, stored and transferred in relation to electronic business transactions is personal data, the collection of which raises concerns about privacy and confidentiality. An increasing number of RTAs has established specific provisions on personal digital information protection. These provisions range from the importance of personal information protection to cooperation to commitments to adopt measures to protect personal data and take into account international standards.

In particular, one of the most common provisions on personal information protection requires the parties to either endeavour to adopt and maintain, or to adopt and maintain laws, regulations or measures ensuring the protection of e-commerce users' personal data. A complementary but less common provision also refers to the importance or commitment to take into account international standards, practices or criteria established by relevant international organizations in the development of standards or measures on personal information protection.

Although not referring explicitly to personal digital information, a limited number of RTAs includes a chapter or article dedicated to the protection of personal data establishing different content principles, such as purpose limitation, data quality and proportionality, transparency, security, and right of access, rectification and opposition. These RTAs also require the establishment of appropriate enforcement mechanisms and coherence with international commitments. More generally, and as

discussed above, the right to protect personal data and privacy is also recognized in the chapter on services and/or financial services of many RTAs, including within the scope of application of general exception clauses in trade in services.

Cybersecurity

The development and use of digital technologies have raised a number of concerns, including regarding cybersecurity, as discussed in Section D.2(c). Only a few RTAs include cooperation provisions on cybersecurity and cybercrime, mainly through the exchange of information and experiences, including on related laws, regulations and best practices. A couple of recently signed RTAs, including the CPTPP, incorporate an article dedicated to cooperation on cybersecurity matters, which recognizes the importance of building the capabilities of the parties' national entities responsible for computer security incident response. The article further recognizes the importance of using existing collaboration mechanisms to cooperate in order to identify and mitigate malicious electronic intrusions or dissemination of malicious code.

Unsolicited commercial electronic messages

Protection against unsolicited commercial electronic messages, often referred to as spam, has been

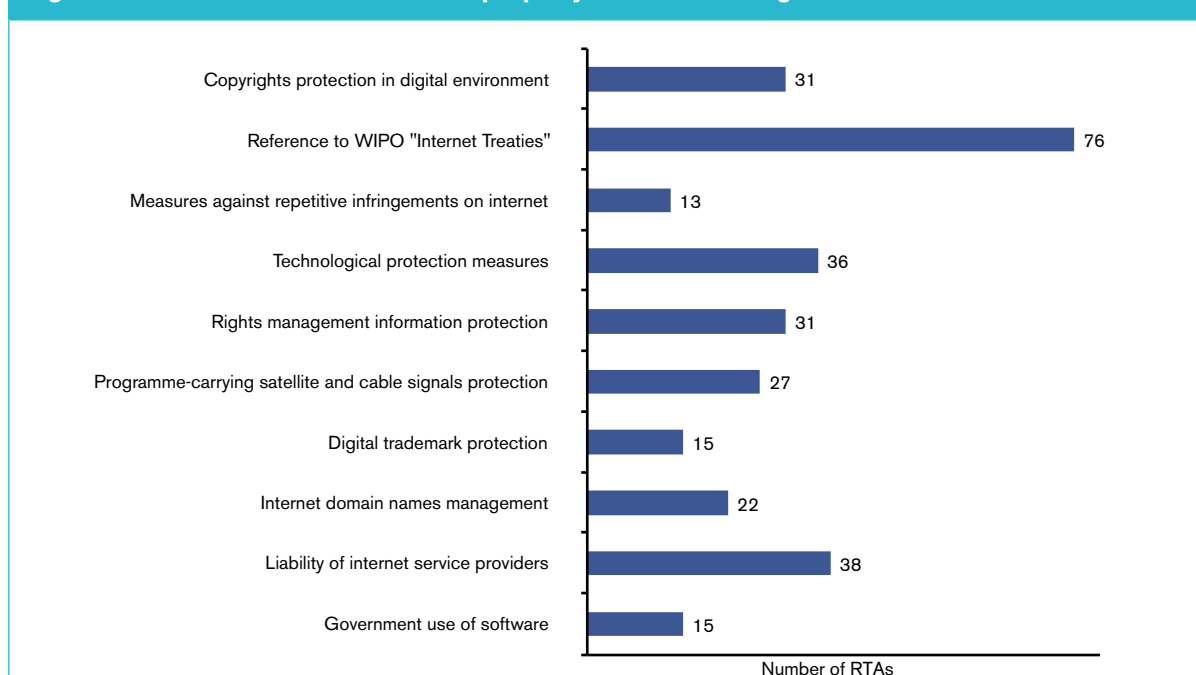
addressed in a limited but increasing number of RTAs. These provisions take different forms ranging from the importance to address spam to cooperation, including in international fora, to commitments to adopt appropriate measures regulating and minimizing spams.

(iv) Intellectual property issues in the digital environment

While the regulatory issues discussed above remain relatively broad in scope, an increasing number of RTAs have explicitly addressed a broad range of different specific digital regulatory issues related to IP, in particular copyright and trademarks.⁵⁶ As with other types of provisions, the language and scope of IP provisions vary widely across RTAs (Valdés and McCann, 2014).

Several IP provisions related to digital technologies cover the protection and enforcement of copyrights and related rights, including through technological protection measures, and rights management information protection, as highlighted in Figure D.6. Other issues covered include programme-carrying satellite and cable signals, digital trademark protection, internet domain names management, liability of internet service providers and government use of software.⁵⁷

Figure D.6: Provisions on intellectual property issues in the digital environment



Source: Updated and extended from Monteiro and Teh (2017).

Copyrights and related rights protection and enforcement

An increasing number of RTAs explicitly recognize the impact of digital technologies on the use of literary and artistic works, such as books, computer programmes, films, musical compositions, and on the use of artistic performances, phonogram productions, and broadcasts.⁵⁸ However, the language and scope of the provisions on protection and enforcement of copyright and related rights in the digital environment differ across agreements, with some provisions relatively more common than others.

Several RTAs recognize the importance of IP in promoting economic and social development, particularly in the new digital economy. Several other agreements confirm that existing IP rights, including reproduction rights, continue to apply to the digital environment. Similarly, an increasing number of RTAs include provisions referring to WIPO Copyright Treaty and WIPO Performances and Phonogram Treaty, commonly known as the “WIPO Internet Treaties”.⁵⁹ As discussed in Section D.3(c), both treaties require the parties to provide a legal framework ensuring adequate IP protection of authors, performers, and other rights-holders when their works are disseminated through new technologies. Provisions referring to the WIPO Internet Treaties range from the affirmation of the existing obligations pursuant to these treaties to commitments to adhere and/or accede to and comply with them. A couple of more recent RTAs also call on or require the accession/ratification to or compliance with the Beijing Treaty on Audiovisual Performances, which regulates copyrights for audiovisual performances and expands performers’ rights, including in the digital environment.

In parallel, some RTAs explicitly refer to authors’ and performers’ exclusive rights to authorize or prohibit their literary and artistic works, and performances or phonograms, in any manner or form, permanent or temporary, including temporary storage in electronic form.⁶⁰ Similarly, several RTAs include provisions on the rights of broadcasting organizations, including the prohibition from retransmitting television signals (whether terrestrial, cable or satellite) on the internet without the authorization of the rights-holder(s), if any, of the content of the signal and of the signal itself. A couple of recent RTAs include also specific provisions on the protection of computer programmes and databases, including with respect to authorship, restricted acts, exceptions to restricted acts and decompilation.⁶¹

Some recent RTAs further require the adoption and implementation of special measures against

repetitive infringements of copyrights and related rights on the internet and over other digital networks in a manner that avoids the creation of barriers to legitimate activity, including e-commerce, and that preserves fundamental principles, such as freedom of expression, fair process and privacy. In that context and as discussed below, some of these RTAs refer to the possibility of limiting the liability of, or the remedies against online service providers.

Technological protection measures

With the increasing use and consumption of digital content, efficient protection of copyrighted works, phonograms and performances is particularly challenging. As discussed in Section D.2(e), technological protection measures (TPMs) have been developed to deter piracy and encourage rights-owners to use digital media. TPMs can take various forms, including access control technology (such as encryption or password protection), and copy or use control measures (such as serial copy management system) to prevent unauthorized copying, transmission and use. The WIPO Internet Treaties require that legal protection and remedies against the circumvention (i.e. hacking) of TPMs be applied to protected works, phonograms and performances.

Besides provisions referring to the WIPO Internet Treaties, a limited but increasing number of RTAs incorporate specific provisions, sometimes very detailed, on TPMs requiring legal protection and remedies, including administrative, civil or criminal procedures in some agreements, against: (i) the unauthorized circumvention of effective TPMs; and (ii) production, sale or rental of circumventing devices promoted or marketed for circumvention purpose.⁶² Some provisions further detail the limitation and exception conditions for which these criminal procedures and penalties do not apply to infringers, such as non-profit library, educational institution or public non-commercial broadcasting entity. A complementary but less common provision further clarifies that the provisions on TPMs do not require the ITC industry to design devices, components or services corresponding to certain TPMs.

Rights management information protection

The online distribution of digital content presents important challenges for the management of creative content and identification of users and copyright-owners (authors or performers). Rights management information (RMI) of a work provides data identifying the copyrighted content, its rights-owners and its terms and conditions of use. RMI is increasingly used in digital rights management for licenses and

royalties, often in the form of an electronic watermark placed in the protected content. The WIPO Internet Treaties require effective legal protection of RMI that accompanies protected works, phonograms and performances.

In addition to provisions referring to the WIPO Internet Treaties, a limited but increasing number of RTAs incorporate specific provisions, often worded differently, on RMI requiring legal protection and remedies, including criminal procedures and penalties in some agreements, against: (i) the removal or alteration of any RMI; and (ii) distribution or broadcasting of works with altered RMI. Some RTAs also specify the limitation and exception conditions for which criminal procedures and penalties do not apply to infringers, such as non-profit library and educational institutions. A complementary but less common provision also clarifies that the provisions on RMI do not require RMI to be attached to copies of a work.

Programme-carrying satellite and cable signals protection

With the ever-increasing use of satellites and cable, including for broadcasting and the reception of copyrighted television programming, the risk of the unauthorized interception of signals and the unauthorized rebroadcasting of programme material, sometimes referred to as “signal piracy”, increases. A limited number of RTAs incorporate several provisions, often worded differently, on the protection of programme-carrying satellite and cable signals.⁶³ Several RTAs either require accession to/ratification of, or recognize, the existing rights and obligations under the Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite. The Convention establishes, among other things, the obligation to take adequate measures to prevent the unauthorized distribution on or from the parties’ territories of any programme-carrying signal transmitted by satellite.

Other more specific provisions focus on encrypted signals. Several RTAs requires the provision of legal protection and remedies, including criminal or civil procedures in some agreements, against: (i) the production or sale of decoding encrypted programme-carrying satellite (and cable) signals system; and (ii) the reception or further distribution of decoded encrypted programme-carrying satellite (and cable) signals. While most RTAs with such provisions cover only satellite signals, a couple of RTAs extend the obligation to cable signals. Some RTAs also extend the provision of remedies to any person injured by these activities, including

any person holding an interest in the encrypted programming signal or its content.

Digital trademark protection

The rapid development of new digital technologies and the expansion of the internet and social media platforms make trademark protection more challenging. A trademark is any sign that individualizes the market products and services of a given enterprise and distinguishes them from its competitors. Provisions related to digital trademark protection have been incorporated in a limited number of RTAs. Some of these provisions recognize or reaffirm the importance of the principles contained in the WIPO Joint Recommendation Concerning Provisions on the Protection of Marks, and other Industrial Property Rights in Signs, on the Internet (WIPO Joint Recommendation). As discussed in Section D.3(c), this WIPO Joint Recommendation proposes a legal framework for trademark owners wishing to use their trademarks on the internet and to participate in the development of e-commerce. Some RTAs further establish commitments to either endeavour to apply the WIPO Joint Recommendation or be guided by the principles contained in the WIPO Joint Recommendation.⁶⁴ A couple of RTAs also explicitly forbid, as unfair competition, acts of providing, through an electric telecommunications line, products using an indication, including a trademark, of a product or business which is identical or similar to another person’s famous indication of products or business.

Internet domain names management

As discussed in Section D.3(c), unlike other IP rights, the registration of internet domain names is global. The registration of domain names is usually not managed by national IP authorities but by organizations accredited by the Internet Corporation for Assigned Names and Numbers (ICANN). The successful registration of a domain name in one part of the world prohibits the registration of that domain name in any other part of the world. In that context, and in order to address the problem of trademark cyber-piracy, a limited number of RTAs include provisions related to internet domain names, many of which are specific to one or several agreements. These provisions range from cooperation to commitments regarding unfair competition and dispute settlement relating to domain names.

Only a couple of relatively recent RTAs forbids and requires the provision of appropriate remedies against registering or holding, with the intention of gaining unfair profit or of causing damage, a domain

name that is identical or confusingly similar to a trademark. Some RTAs list possible remedies, such as revocation, cancellation and transfer of registered domain names. Other relatively more common provisions require the management of each party's country-code top-level domain (ccTLD) to establish an appropriate dispute settlement procedure, consistent with the international principles recognized by ICANN, for cases related to the bad-faith registration of domain names in violation of trademarks. These principles include expeditious, low-cost, fair, equitable and not overly burdensome dispute resolution procedures, without precluding a resort to judicial proceedings. A complementary provision also requires the management of each party's ccTLD to provide online public access to a reliable and accurate database of domain name registrant contact information. Other idiosyncratic provisions include participating in ICANN Governmental Advisory Committee or supporting endeavours to develop international policies or guidelines governing the resolution of disputes relating to domain names and trademarks.

Liability of internet service providers

As highlighted in Section D.2(e) and D.3(b), as part of their efforts to enforce copyrights in the internet and to fight against cyber-piracy, a number of countries have established a domestic legal framework requiring internet service providers (ISPs) to cooperate with authorities in the elimination and/or prosecution of IP violations by internet users, limiting, in exchange, the liability for or remedies against ISPs for IP infringements by the users of their online services (e.g. online video platform) or facilities. The liability of intermediary service providers, sometimes referred to as "safe harbour", has been addressed in a limited but increasing number of RTAs in order to promote the legitimate digital trade of books, movies, series, music and software. These provisions range from cooperation, including with the business community, to specific commitments limiting the liability of providers acting as mere conduit, caching, hosting or linking digital services.

In particular, several RTAs call on or require the establishment of legal incentives for ISPs to cooperate with copyright owners in deterring the unauthorized storage and transmission of copyright materials. These agreements and several others also call on or require the parties to ensure that the intermediary service providers are not held liable for third-party illegal content, provided they meet conditions specific to whether they are mere conduits or provide hosting and caching (storing). Some RTAs extend the limitation of liability to ISPs referring

or linking online content through hyperlinks and directories. RTAs with such provisions often define in detail the conditions for which the liability of ISPs can be limited.⁶⁵

A complementary but less common provision specifies that provisions limiting the liability of ISPs do not affect the possibility of a court or administrative authority requiring ISPs to terminate or prevent an infringement. A related provision further commits the parties not to impose a general obligation on ISPs to: (i) monitor the information they transmit or store when offering mere conduit, hosting and caching; and (ii) actively seek facts or circumstances indicating illegal activity. The provision, however, specifies that parties may establish obligations for ISP to inform promptly, upon request, the competent public authorities of alleged illegal activities or information. In that context, several RTAs require the establishment of a notice and takedown system, according to which ISPs expeditiously remove or disable access to material in response to court orders or allegations that its content infringes copyrights. Certain RTAs also require ISPs to adopt and implement policy that provides, in appropriate circumstances, for the termination of the account of repeated infringers.

Government use of software

Efforts to fight software piracy within governmental institutions are also addressed in a limited number of RTAs. The most common provision, often worded differently, requires the parties to issue appropriate laws, orders, regulations, or administrative or executive decrees actively regulating the acquisition and management of computer software at the central level of government in order to confirm that all central government agencies use legitimate software. The most detailed version of this provision lists possible type of measures, such as procedures preparing and maintaining inventories of software on agency computers and inventories of software licenses. A complementary but less common provision also commits each party to encourage its respective regional and local governments to adopt similar measures.

(v) Electronic government

Although there is no internationally agreed definition of electronic government (e-government), it typically encompasses the use of ICT to deliver services in the public administration. A large and increasing number of RTAs include a broad range of provisions related to e-government that can be found in the chapters on e-commerce, government procurement, intellectual property, rules of origin, sanitary and

phytosanitary measures, technical barriers to trade, trade facilitation, and trade in services, among others. While some provisions refer to paperless trading administration in general, other provisions apply to specific areas, such as rules of origin, customs operation systems, IP registration, and government procurement, as shown in Figure D.7. Many RTAs also establish transparency commitments with the possibility or obligation to publish electronically, including on the internet, relevant information. Similarly, many RTAs promote the use of ICT to administer specific institutional arrangements, such as committees established under the agreements.

Paperless trading administration

Paperless trading refers to the process of making trade administration documents submitted by importers and exporters available and accepted electronically. An increasing number of RTAs includes specific provisions on paperless trading, ranging from cooperation, including in international fora, to commitments to make available and accept electronic trade administration documents and take into account international standards in developing paperless trading.

Electronic certificate of origin system

Rules of origin correspond to the criteria established to determine the national source of a product. These

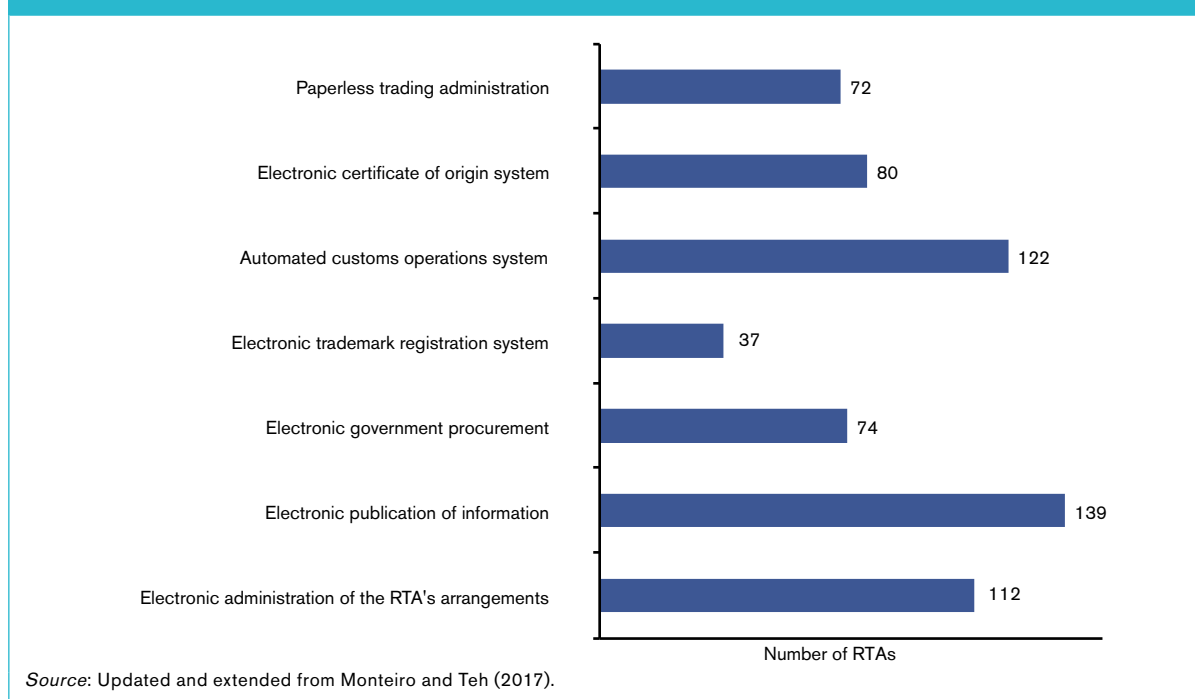
rules are needed to determine whether a product is qualified to receive preferential tariff treatment under a RTA. Several RTAs include specific provisions considering the possibility of applying an electronic certificate and verification system, or at least developing or using electronic certificates of origin or electronic declarations of origin. The record-keeping requirements related to the certificate of origin procedure often also mention the possibility of keeping electronic or digital records.⁶⁶

Automated customs operations system

The number of RTAs with trade facilitation provisions has not only increased very rapidly since the 1990s, but the coverage of trade facilitation measures has also expanded in the last 10 years (WTO, 2015b). Similarly, the chapters on customs procedures or trade facilitation in an increasing number of RTAs include at least one provision related to the application of ICT to simplify and automate customs procedures (Duval and Mengjing, 2017). These provisions, often formulated differently, range from cooperation to commitments to promote or apply automated customs systems.

In particular, some RTAs promote or require the creation of an electronic system of information exchange between the customs administration and the trading community, if possible based on international standards. These agreements further

Figure D.7: Provisions on electronic government management



promote the development of compatible electronic systems between the parties' customs administrations to facilitate the exchange of international trade data. In that context, these agreements also promote the development of a set of common data elements and processes (for instance in accordance with the WCO Customs Data Model and related recommendations and guidelines). Other more specific provisions refer to the application of electronic systems for the advance submission of the information necessary for the release of imported goods at the border (including for express shipments in some agreements), express shipments, payment for duties, risk management and single windows. A limited number of RTAs further require the introduction of ICT be carried out, to the extent possible, in consultation with all relevant parties directly affected.

Electronic trademark registration system

Only a few relatively recent RTAs include provisions related to electronic trademark registration systems. A couple of agreements refer to the importance of, accession to/ratification of, or compliance with the 2006 Singapore Treaty on the Law of Trademarks. This WIPO treaty covers administrative trademark registration and licensing procedures and addresses, among other things, the use of modern communication technologies to process and manage trademark rights. Several RTAs foresee the possibility of establishing an electronic system for the registration of trademarks, or at least providing the applicant with an electronic communication of the reasons for a refusal to register a trademark.⁶⁷

Electronic government procurement

Government procurement is another area increasingly covered in RTAs. Many of the most detailed chapters on government procurement found in RTAs include provisions, sometimes worded differently, addressing the use of electronic means for conducting government procurement.⁶⁸ Some of these provisions replicate the WTO's revised Government Procurement Agreement's provisions regarding, among other things, the general principles related to the use of electronic means and the requirements related to electronic auction. Other more specific provisions on government procurement related to digital technology are found in an increasing number of RTAs.

Some agreements require the parties to seek to provide opportunities for government procurement to be undertaken through electronic means, including the internet. A limited number of relatively recent RTAs also call upon or require the parties to adopt policies and procedures for the use of electronic means

in procurement that: (i) protects documentation from unauthorized and undetected alteration; and (ii) provides appropriate levels of security for data on the procuring entity's network. As discussed below, several agreements also commit the parties to endeavour to use electronic means of communication to disseminate information on government procurement efficiently. In that context, some of these agreements call upon or require the adoption or maintenance of a single electronic portal for access to comprehensive information on government supply opportunities as well as information on measures relating to government procurement.⁶⁹ A couple of recent RTAs include similar provisions promoting the use of ITC aimed specifically at facilitating the participation of MSMEs in government procurement.

Electronic publication of information

Enhancing the transparency of trade policy is an important component in a large number of RTAs. Many of these agreements include different provisions referring to the possibility or obligation to publish electronically, including on the internet or through different electronic means, specific information and documents.⁷⁰ These provisions, particularly heterogeneous in terms of scope and language, can be found throughout the agreement. Some provisions refer to the electronic publication, including through the internet, of broad information, such as proposed and existing laws, regulations and information related to trade in goods, services, government procurement, intellectual property, customs procedure, competition or MSMEs. Conversely, other provisions focus on the electronic publication of specific information, such as visa requirements, new import licensing procedures, tariff-rate quota, fees and charges, advance ruling decisions, notices of intended government procurement and tender documentation. The electronic notification of proposed technical barriers to trade or sanitary and phytosanitary measures is also explicitly foreseen in some agreements, including the publication of responses to comments received. Similarly, several RTAs encourage or require the publication of electronic IP databases on trademarks, domain names, plant variety protection and geographical indications.

Electronic administration of the RTA's institutional arrangements

An increasing number of RTAs establish specific institutional arrangements, such as focal points or committees, in order to review and monitor the implementation and operation of the agreement, or of specific chapters such as those on technical barriers to trade, sanitary and phytosanitary measures and the environment. Although the nature and structure

of these arrangements differs across RTAs, some of these agreements include provisions referring to the possibility of using electronic means to implement specific commitments. Some RTAs mention the possibility of using any technological means, including ICT, available to the parties to conduct committee meetings. Similarly, some RTAs detail the dispute settlement procedure and mention the possibility of sending written submissions electronically and of organizing the panel work by electronic means, including consultations via videoconference.

(vi) Cooperation and technical assistance

As highlighted above, many provisions related to digital technologies refer to cooperation. Some provisions identify science and technology, ICT or more specifically e-commerce as a cooperation area without providing any additional details or defining any actions. Conversely, other provisions specify the form(s) and/or topic(s) of cooperation. In most cases, the issues identified are part of a non-exhaustive list of potential cooperation areas.

Cooperation on science and technology and ICT cover different specific issues, such as broadband access, network security, IP, statistics or trade facilitation. Other cooperation provisions apply to specific sectors, such as the broadcasting and software industries. Many issues covered by these cooperation provisions are only specific to a couple of RTAs, such as cultural heritage digitalization, intelligent transport systems, virtual reality and digital cinema.

Cooperation provisions on e-commerce also cover a broad range of issues, many of which were discussed previously in this subsection. Promoting and enhancing the development of e-commerce, including by improving its effectiveness and efficiency, is one of the most covered cooperation issues. Other commonly addressed issues include the domestic legal and policy framework of e-commerce, electronic authentication, consumer protection and personal data protection. Several RTAs also include cooperation provisions promoting the use of e-commerce by MSMEs, including, in some agreements, by identifying and overcoming the obstacles faced by MSMEs engaged in e-commerce (Monteiro, 2016).

The most common form of cooperation is exchanging relevant information and sharing experiences on regulations, policies and programmes regarding specific issues related to e-commerce. Other types of cooperation include policy dialogue, participation in international fora, training, research, best practices-sharing, joint projects and exchange of professionals.

In some cases, the negotiation of cooperation provisions related to digital technologies in RTAs takes place in a broader context in which the parties have previously negotiated cooperation agreements on ITC or e-commerce. For instance, before concluding their RTA, Japan and Australia negotiated a framework for cooperation in the information economy and ICT industries covering various issues, such as the digital divide and personal data privacy.

(vii) Upcoming provisions related to digital technologies

Over the last 25 years, issues related to digital technologies have been explicitly addressed in an increasing number of RTAs. In parallel, the scope of many of these provisions has tended to increase in recent years and are likely to continue to increase in the future. These provisions cover a broad range of issues: trade rules and market access commitments; telecommunications regulatory issues; digital regulatory issues; intellectual property protection; e-government management; and cooperation. Most provisions related to digital technologies do not follow a specific and unique template, even in some agreements negotiated by the same country. As a result, provisions related to digital technology remain particularly heterogeneous in terms of structure, language and scope.

The most common types of provisions related to digital technologies refer to e-government, cooperation and the moratorium on customs duties on electronic transmissions. Other issues covered in an increasing number of RTAs include the general domestic legal framework of e-commerce, as well as more specific issues, such as electronic authentication, consumer protection, personal information protection and intellectual property. Other issues addressed in a relatively more limited number of mostly recent agreements include cross-border information flows and data localization.

Overall, while many RTAs have recognized or adapted their commitments to the evolution of digital technologies, most detailed and comprehensive provisions related to digital technologies are often incorporated in a limited number of mostly recent RTAs. In fact, only a limited number of RTAs includes provisions addressing most of the issues related to digital technologies identified above. The approach to addressing some of these issues also differs in some agreements, likely reflecting, at least in part, different political sensitivities. That being said, given the dynamic nature of RTAs, provisions related to digital technologies are likely to keep evolving with new and more comprehensive types of provisions.

(e) Proposals from recent studies on how to promote digital trade

Several studies argue that conventional trade barriers are a significant obstacle to the expansion of digital trade and that the reduction and elimination of such barriers should therefore be viewed as a key component of a digital trade agenda. One example often mentioned in this respect is the reduction of tariffs on high-technology products and, closely related to this, the expansion of the product coverage of, and increase in the number of countries participating in, the WTO Information Technology Agreement. The simplification of customs procedures is another important example often referred to in the literature of how conventional trade policy can support the expansion of digital trade. Proposals have been made to increase the minimum value of imports below which no duty, tax or other administrative fee is charged, and allow for the digital submission of customs forms.

In addition, an emerging literature has also proposed developing new or enhancing existing WTO disciplines in light of what has been achieved in some recent RTAs, for example as regards the cross-border transfer of information, data localization requirements, e-signatures and e-authentication, protection of the personal information of users of e-commerce, or protection of consumers online (see the opinion piece by Anupam Chander, Georgetown University Law Center, on page 194, as well as Chander, 2013; Meltzer, 2016; and Cowhey and Aronson, 2017). A number of observers have suggested that a dedicated instrument be negotiated to incorporate such new rules, while others have emphasized the extent to which existing WTO agreements already cover and allow for addressing such matters.⁷¹

In addition, as discussed above, WTO rules on trade in services already apply to services supplied electronically, and cover, in particular, key measures affecting foreign investment and competitive conditions in such enabling sectors as telecommunications. A number of studies emphasize the importance of GATS obligations, as well as of an expansion of members' market access and national treatment commitments to enhance digital trade.⁷² These studies suggest that digital trade can be supported through actions that could be taken within the framework of the GATS, including by groups of members improving commitments in their schedules on most-favoured-nation basis, without requiring the creation of a new standalone body of rules, as was done for the Information Technology Agreement.⁷³

4. Conclusions

This section has discussed the domestic and international policy dimensions of the digitalization of international trade and identified certain aspects of policies that may warrant international cooperation.

Several aspects of the current policy and regulatory context of digital trade have been highlighted. First, digital trade is becoming a more complex and debated aspect of international trade relations, notably as a consequence of the possible scope for strategic trade rivalry and heightened concerns regarding various policy aspects, including security. Second, digital trade raises issues at the intersection of trade governance, such as market access and non-discrimination, on the one hand, and certain aspects of internet governance, such as online privacy and consumer protection, on the other. Third, the effects of digitalization on international trade rules are of a horizontal, cross-cutting nature.

Because existing WTO trade rules on goods, services and the protection of intellectual property rights are technologically neutral, in the sense that they apply irrespective of the particular mode of delivery of a good or service, digital trade is, in principle, covered by those rules. Rules on trade in services are especially relevant. The question that arises is whether further actions should be taken in this context to support digital trade, such as the expansion of market access and national treatment commitments, and the development of horizontal rules on matters such as consumer protection.

Specific provisions addressing digital trade have been adopted in an increasing number of RTAs. Their structure, scope and language have evolved over the years, with recent provisions often more comprehensive and detailed.

While the expansion of digital trade will entail considerable benefits, it is important to ensure that this expansion takes place under conditions that adequately address certain regulatory challenges. Issues concerning privacy protection and cybersecurity are likely to figure prominently in debates on the future governance of digital trade.

Although not specific to digital technologies, privacy protection has been addressed in trade agreements in different ways.⁷⁴ Some agreements, including WTO rules on trade services, include privacy protection within the scope of application of general exception clauses. Other agreements, including certain RTAs, establish substantive principles of personal data protection and enforcement mechanisms, or require

OPINION PIECE

Enabling and regulating the digital economy

By Anupam Chander, Georgetown University Law Center

The internet is the twenty-first century's Silk Road, powering trade across the globe in ways heretofore impossible. The internet arrived on many nations' shores without much prior preparation by governments, and it would take time to see how the internet would transform every part of life – from socializing, to learning, to creating. Regulators were often left struggling to catch up, eager to embrace the opportunities the digital economy offered for their citizens, yet concerned about the disruptions and other challenges that accompanied it. The regulatory framework for the digital economy developed at both the international and national levels, proceeding from an initial, largely enabling, phase to the recent more regulatory phase.

The first phase of internet regulation focused largely on enabling new forms of electronic commerce. At UNCITRAL in 1996, the nations of the world agreed to recognize electronic contracts and records in their domestic law. The United States led the world in removing legal risks for internet enterprises for the actions of their users, including for users' copyright infringement or defamation. At the WTO in 1998, the Ministerial Council agreed on a moratorium on customs duties on electronic transmissions, spurring cross-border trade in digital products.

Although they were conceived at the dawn of the internet age, the WTO's foundational agreements addressed telecommunications and other electronic networks, including the internet. The General Agreement on Trade in Services (GATS) recognized four modes of supply, including cross-border trade, in which the supplier and the consumer transact from their respective home economies across a

border. Many members made specific commitments to liberalize cross-border trade in database services, data-processing services, computer services, telecommunications services, as well as other services, such as financial services and travel agency services, to name a few, that could now be provided across borders electronically. Indeed, in its first decade, the WTO would face a dispute where a member state complained that another member state's ban on internet gambling was inconsistent with its commitments on cross-border supply (*US – Gambling*).

Even during this early period, governments enacted laws to address some growing concerns. The European Union promulgated a directive to regulate the automated data-processing of personal information. A 1996 WIPO treaty promoted national laws that would strengthen efforts to protect copyrighted works through encryption and other technological tools. Some countries extended existing censorship from print and broadcasting media to the internet, often barring controversial information and even entire internet platforms from abroad as a result.

As the digital economy has grown, governments have sought to impose greater control over the internet. In this second, regulatory phase of governmental intervention, national governments have contended more deeply with issues such as free expression, data privacy, algorithmic decision-making and taxation. Even local governments have found themselves grappling with taxi and hotel regulations and, on occasion, smart city deployment. As data has emerged as the lifeblood of the digital economy, governments have sought

to protect privacy amidst global flows, as evidenced in the European Union's strengthened data privacy regime, the General Data Protection Regulation.

The rise of cloud computing, in which the storage and processing of information are provided as a service from remote computers, gives individuals and companies access to powerful computers that they could not otherwise afford on their own. Cloud computing, however, increases jurisdictional complexities. The United States recently adopted the "Cloud Act" to promote regulated data-sharing across borders. Governments have become increasingly concerned about the movement of data across borders, but national measures mandating that data be localized at home by their very nature disfavour foreign providers. Eleven Pacific states have adopted a free trade agreement – the CPTPP – that ensures that restrictions on cross-border data flows will be justified by legitimate public policy interests, rather than used to discriminate against foreign suppliers. Privacy, cybersecurity and traditional consumer protection have become critical components of international trade, and trade agreements will have to assure these values.

The regulatory framework will find new challenges in the latest technological innovations. The internet undergirds the most revolutionary technologies of this century, including smart cities, the sharing economy, virtual and augmented reality, artificial intelligence, and robotics. Such technologies will require both enabling and regulatory interventions, both at the national and international levels.

the adoption of measures to protect e-commerce users' personal data, taking into account relevant international standards. It is important to ensure the interoperability of different privacy regimes.

Cybersecurity has emerged as a source of concern regarding its effects on digital trade. Recent international efforts towards progress on common norms have stalled. Indeed, the very meaning of the concept of cybersecurity or information security is a matter of debate. A limited but increasing number of RTAs includes provisions specifically addressing cybersecurity and cybercrime through cooperation.

The evidence suggests that there has been an increase in data localization measures in recent years. These measures are typically applied for a variety of policy reasons. A number of studies point to the adverse economic effects of such policies. Only a couple of recent RTAs, including mega-regional agreements, establish specific provisions on the use and location of computing facilities.

Finally, an important normative consideration with respect to future international initiatives to promote the expansion of digital trade is how they will contribute to make trade more inclusive. Several dimensions need to be considered. A first question relates to the digital divide, its consequences and the measures that can be taken to bridge it. These include the use of international agreements, such as the GATS, to make commitments that enhance policy credibility and thereby help attract foreign direct investment. A second question concerns the participation of MSMEs and the extent to which digital innovation will level the trading field. A related question is whether digitalization will bring with it more or less competition. If winner-takes-all dynamics prevail, national competition authorities are likely to play a prominent role, which, given the cross-border nature of digital firms, will highlight the need for international cooperation.

Appendix D.1: Main types of provisions related to digital technologies in RTAs

(i) Trade rules and market access in relation to digital trade

- Applicability of WTO rules to e-commerce
- Scope of e-commerce chapter
- Non-discriminatory treatment of digital products
- Customs duties on digital products
- Avoidance of trade barriers faced by e-commerce
- Liberalization commitments in relation to digital services
- Cross-border information flows
- Cross-border financial information flows
- Location of computing facilities
- Software source code protection

(ii) Telecommunications regulatory issues

- Domestic telecommunications regulatory framework
- Access to and use of internet
- Internet interconnection charge-sharing

(iii) Domestic regulatory framework for e-commerce

- Domestic regulations
- Electronic authentication and signatures
- Online consumer protection
- Personal information protection
- Cybersecurity
- Unsolicited commercial electronic messages

(iv) Intellectual property issues in the digital environment

- Copyrights and related rights protection and enforcement in the digital environment
- Reference to WIPO "Internet Treaties"
- Protection of computer programmes and databases
- Television signal retransmission on the internet

- Special measures against repetitive infringements on internet
- Technological protection measures
- Rights management information protection
- Programme-carrying satellite and cable signals protection
- Digital trademark protection
- Internet domain names management
- Liability of internet service providers
- Government use of software

(v) Electronic government

- Paperless trading administration
- Electronic certificate of origin system
- Automated customs operations system
- Electronic trademark registration system
- General principles of use of electronic means in government procurement
- Electronic auction requirements in government procurement
- Use of electronic communication to disseminate information on government procurement
- Single electronic portal for information access on government procurement
- Use of electronic communication to undertaken government procurement
- Measures for documentation and data protection on government procurement
- Limited tendering for technical reasons
- Electronic publication of information
- Electronic administration of the RTA's institutional arrangements

(vi) Cooperation and technical assistance

- Cooperation and technical assistance on science
- Cooperation and technical assistance on ICT
- Cooperation and technical assistance on e-commerce

Endnotes

- 1 See for example <https://www.healyconsultants.com/blog/haiti-area-of-interest-for-foreign-direct-investment/> and <https://www.export.gov/article?id=Rwanda-Openness-to-Foreign-Investment>
- 2 <http://www.ictacademy.in/pages/Digital-Empowerment.aspx>; https://changingthepresent.org/collections/committee-for-democracy-in-information-technology/education_technology-access
- 3 <https://www.pmgdisha.in/>; <http://www.bus.umich.edu/kresgepublic/journals/gartner/research/109700/109759/109759.html>
- 4 As observed in ITU (2017), significant gaps persist between developing and developed economies with respect to internet access and even more with regard to broadband access. In developed economies in 2016, fixed and mobile broadband subscriptions covered, on average, 30.1 per cent and 90.3 per cent of the population, respectively; in developing economies, these figures stood at 8.2 per cent and 40.9 per cent (ITU, 2016). The cost of mobile broadband is also much higher in a number of developing countries.
- 5 The European Centre for International Political Economy's (ECIPE) Digital Trade Restrictiveness Index (DTRI) maps and measures policy restrictions to digital trade 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. See ECIPE (2017).
- 6 Local content requirements may also be inconsistent with the obligations in Article III:4 of the GATT 1994 and Article 2.1 of the Agreement on Trade-Related Investment Measures (TRIMs Agreement), which prohibit measures that require the purchase by firms of products of domestic origin or from any domestic source. The obligations in the TRIMs Agreement apply to measures related to trade in goods only.
- 7 The weight of the ICT sector in the total EU economy reaches 3.9 per cent, behind China and India (4.7 per cent), the United States (5.3 per cent) and Japan (5.4 per cent). The ICT services subsector, which includes computer and related activities and telecoms, is the leading subsector, representing 73.1 per cent of the total value added of the ICT sector globally, while the manufacturing sub-sector constitutes the remaining 26.9 per cent. In the European Union, ICT services represent more than 90 per cent of total ICT value-added in 2014. See European Commission (2017g).
- 8 ECIPE (2017) provides a snapshot of tariff and non-tariff measures affecting imports of digital products in 64 countries.
- 9 Based on Goldfarb and Trefler (2018b) and Agrawal et al. (2018).
- 10 Guided by similar concerns to promote "biodiversity", Germany and Belgium have also followed suit with fixed-price laws for e-books.
- 11 One possible alternative suggested by the OECD is to use a small but non-transitory decrease in quality (SSNQ) test.
- 12 One argues that services commitments in international trade agreements provide a credible instrument for anchoring unilateral policy reforms and limiting policy substitution. Another sees the process of services trade-opening as part of government responses to changes in the nature of production towards international supply chains. See the discussion of economic theories of the GATS in WTO (2012c).
- 13 A number of studies provide taxonomies and purport to provide empirical estimates of the existence of such barriers to digital trade (Ciuriak and Ptashkina, 2018a; Chander and Le, 2015; UNCTAD, 2017a).
- 14 Policy and regulatory divergencies exist with regard to several aspects of data policies, including in respect of the protection of privacy and personal data, which is now widely seen as one of the critical aspects of the regulatory environment that needs to be addressed in order to construct "a trusted digital environment". Domestic data protection laws differ with regard to how to define the information to be protected as private or as personal data, whether the protection of privacy and personal data is treated as a matter of consumer protection or as a matter of protection of fundamental human rights, and whether such protection is provided for in generic or sector-specific laws (de Terwangne, 2009; Kuner, 2011; Schwartz, 2013; Schwartz and Solove, 2014; Cowhey and Aronson, 2017; Yakovleva, 2017). See also Section D.3(c)(iii).
- 15 For different views on this matter, see, for example, Cowhey and Aronson (2017) and Greanleaf (2016).
- 16 Argentina; Chile; China; Colombia; Costa Rica; Guatemala; Kazakhstan; Kenya; Mexico; Moldova; Montenegro; Nigeria; Pakistan; Sri Lanka; and Uruguay.
- 17 See <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1477>
- 18 At the WTO in 1998, the Ministerial Council agreed on a moratorium on customs duties on electronic transmissions, which entails that WTO members should not impose customs duties on electronic transmissions. At the 11th WTO ministerial meeting in Buenos Aires in December 2017, the Indonesian Delegation circulated a statement regarding the scope of the application of the moratorium on customs duties on electronic transmissions (in the context of e-commerce discussions). The statement explains that it is Indonesia's understanding that this moratorium shall not apply to electronically transmitted goods and services and that the extension of the moratorium applies only to the electronic transmissions and not to products or contents which are submitted electronically (see WTO document WT/MIN(17)/68) dated 20 December 2017).
- 19 The Agreement defines the modes for trade in services as follows: Mode 1: cross-border supply – whereby the service is supplied from the territory of one member into that of another; Mode 2: consumption abroad – whereby a consumer in one member purchases a service delivered in the territory of another member; Mode 3: commercial presence – whereby a service supplier in one member

- establishes a subsidiary or a branch in the territory of another member in order to supply services; Mode 4: presence of natural persons – whereby an individual from one member is temporarily present in the territory of another to supply a service.
- 20 They relate to: the number of service suppliers; the value of service transactions or assets; the number of operations or quantity of output; the number of natural persons supplying a service; the type of legal entity or joint venture; and the participation of foreign capital.
- 21 In terms of the definitions in the Annex, “Public telecommunications transport service” means any telecommunications transport service required, explicitly or in effect, to be offered to the public generally and typically involving the real time transmission of customer supplied information without any end to end change in its form or content, while “Public telecommunications transport network” means the public telecommunications infrastructure permitting telecommunications between and among network termination points.
- 22 Meaning, “Terms and conditions no less favourable than those accorded to any other user of like public telecommunications transport networks or services under like circumstances”.
- 23 See paragraph 5c of the Annex.
- 24 In the case of trade in services, even when barriers are low, there is often no certainty that these may not rise in the future as a result of pressures for protection. The perceived benefits of increased bindings on services in RTAs likely explains, much of the proliferation of such accords over the past 15 years.
- 25 These relate to certain goods and services supplied directly or indirectly by the buyer free of charge or at reduced cost, for use in connection with the production and sale for export of the imported goods, to the extent that such additional payments had not been included in the declared customs value.
- 26 Customs administrations must try to determine the customs value based on the transaction value of the goods. When this is not possible (e.g. because there was no sale), customs administrations will then try to apply alternative valuation methods in a pre-determined sequence: transaction value of identical goods; transaction value of similar goods; the deductive method; and the computed method. Only if one valuation method is not applicable they can move to the next one. If none of these methods can be applied, Article 7 of the CVA provides for a residual or “fall-back” method, according to which customs will try to apply the methods but in a more flexible manner. In all cases, the value must be fair and reflect commercial reality.
- 27 Advisory Opinion 22.1 notes that it could be determined “on the basis of the cost directly incurred in transcribing the engineering designs and development plans onto the paper and printing of such documents”. In other words, the value of the documents could be based on the cost of producing the paper version of those engineering plans.
- 28 A 2013 ruling in the United States determined that the license fees paid by the importer to the manufacturer for a license key and download of firmware that expanded the capabilities of a machine were not dutiable as part of the price actually paid or payable, nor were they additions to value as royalties or proceeds of subsequent resale (WCO, 2015).
- 29 Under the Brussels Definition of Value, a normal market price, defined as “the price that a good would fetch in an open market between a buyer and seller independent of each other,” was determined for each product, according to which the duty was assessed. Factual deviations from this price were only fully taken into account where the declared value was higher than the listed value. Downward variations were only taken into account up to 10 per cent.
- 30 See United States Government (US Customs and Border Protection, 2013).
- 31 Under the Brussels Definition of Value, there is a distinction between hardware-related software, usually called “operating software” (i.e. the one integrated in an apparatus), and “user application software” (i.e. which can be loaded into the memory of an apparatus temporarily).
- 32 See GATT document VAL/8.
- 33 TRIPS non-discrimination principles, found in Articles 3, 4 and 5, do not contain any general exceptions for economic integration equivalent to the exceptions in Article XXIV of the GATT 1947 or Article V of the GATS.
- 34 The Diplomatic Conference held in December 1996 adopted the following Agreed Statement concerning Article 1(4) of the WIPO Copyright Treaty, which incorporates by reference the substantive obligations of the Berne Convention: “The reproduction right, as set out in Article 9 of the Berne Convention, and the exceptions permitted thereunder, fully apply in the digital environment, in particular to the use of works in digital form. It is understood that the storage of a protected work in digital form in an electronic medium constitutes a reproduction within the meaning of Article 9 of the Berne Convention”.
- 35 Article 11(1)(ii) of the Berne Convention provides that authors of dramatic, dramatico-musical and musical works shall enjoy the exclusive right of authorizing any communication to the public of the performance of their works. Similarly, authors of literary works enjoy the exclusive right of authorizing any communication to the public of the recitation of their works (Article 11ter(1)(ii)). Article 14(1)(ii) provides authors of literary or artistic works with the exclusive right of authorizing the public performance and communication to the public by wire of their works if adapted or reproduced by means of cinematography, and Article 14bis(1) grants the same right to the owner of copyright in a cinematographic work. Article 11bis(1)(i) and (ii) provides that authors of literary and artistic works shall enjoy the exclusive right of authorizing: (i) the broadcasting of their works or the communication thereof to the public by any other means of wireless diffusion of signs, sounds or images; and (ii) any communication to the public by wire or by rebroadcasting of the broadcast of the work, when this communication is made by an organization other than the original one.
- 36 Article 8 of the WIPO Copyright Treaty reads: “Without prejudice to the provisions of Articles 11(1)(ii), 11bis(1)(i) and (ii), 11ter(1)(ii), 14(1)(ii) and 14bis(1) of the Berne Convention, authors of literary and artistic works shall enjoy the exclusive right of authorizing any communication to the public of their works, by wire or wireless means, including the making available to the public of their works in such a way that members of the public may access these works from a place and at a time individually chosen by them”.

- 37 As regards the scope of this right in respect of intermediaries who provide physical facilities for communication without actively initiating it, the Diplomatic Conference adopted the following Agreed Statement: "It is understood that the mere provision of physical facilities for enabling or making a communication does not in itself amount to communication within the meaning of this Treaty or the Berne Convention".
- 38 Certain countries have a common system for the protection of trademarks or a common procedure for the filing and registration of trademarks. The Madrid Agreement concerning the International Registration of Marks, and the Protocol thereto, provide for the international application of registration of trademarks at the International Bureau of WIPO.
- 39 These governing bodies decided to "[r]ecommend that each Member State may consider the use of any of the provisions [...] as guidelines concerning the protection of marks, and other industrial property rights in signs, on the Internet". Article 1(i) of the Joint Recommendation defines that a "Member State" means a State member of the Paris Union for the Protection of Industrial Property, of the World Intellectual Property Organization, or of both".
- 40 According to paragraph 4 of the *Work Programme on Electronic Commerce – Progress Report to the General Council*, adopted by the Council for Trade in Services on 19 July 1999 (official WTO document number S/L/74, 27 July 1999): "It was also the general view that the GATS is technologically neutral in the sense that it does not contain any provisions that distinguish between the different technological means through which a services may be supplied."
- 41 The seven LDCs assessed were Bhutan, Cambodia, Lao People's Democratic Republic, Liberia, Myanmar, Nepal and Samoa.
- 42 The principle of non-discrimination ensures that a document would not be denied legal effect, validity or enforceability solely on the grounds that it is in electronic form. The principle of technological neutrality mandates the adoption of provisions that are neutral with respect to technology used. In light of the rapid technological advances, neutral rules aim to accommodate any future developments without further legislative work. The functional equivalence principle lays out criteria under which electronic communications may be considered equivalent to paper-based communications. In particular, it sets out the specific requirements that electronic communications need to meet in order to fulfil the same purposes and functions that certain notions in the traditional paper-based system – for example, "writing," "original," "signed," and "record" – seek to achieve.
- 43 The Carnegie Endowment for International Peace has created a Cyber Norms Index that provides an overview of the various international fora in which cybersecurity issues are being or have recently been discussed (<https://carnegieendowment.org/publications/interactive/cybernorns>). Proposals made by some economies since the late 1990s for the negotiation of a global treaty on cybersecurity issues have failed to attract support. The only international legally binding instrument in this area is the Convention on Cybercrime, also known as the Budapest Convention, which was concluded within the framework of the Council of Europe and entered into force in 2004.
- 44 The 2013 UN GGE established several basic norms, including that "International law, and in particular the Charter of the United Nations, is applicable and is essential to maintaining peace and stability and promoting an open, secure, peaceful and accessible ICT environment" and that "States must meet their international obligations regarding internationally wrongful acts attributable to them. States must not use proxies to commit internationally wrongful acts. States should seek to ensure that their territories are not used by non-State actors for unlawful use of ICTs" (United Nations, 2016a). The 2015 UN GGE significantly expanded and elaborated on the norms set out in the 2013 report (United Nations, 2016b). For example, it agreed that "A State should not conduct or knowingly support ICT activity contrary to its obligations under international law that intentionally damages critical infrastructure or otherwise impairs the use and operation of critical infrastructure to provide services to the public".
- 45 Especially international laws concerning state responsibility, self-defence and humanitarian law.
- 46 In addition to negative spillovers (e.g. one jurisdiction or its enterprises being adversely affected by enforcement decisions taken in other jurisdictions), there can of course be important positive spillovers from competition law enforcement (e.g., anti-cartel enforcement in one jurisdiction also benefitting consumers in other jurisdictions in which the same cartels have been active).
- 47 See also diverse examples of relevant inputs on the websites of the ICN, OECD and UNCTAD.
- 48 For instance, in 2017, the Federal Antimonopoly Service (Russia's competition agency) suggested discussing and reconsidering the new approaches to antimonopoly regulation and economic analysis tools in the digital economy at the Fifth BRICS Competition Conference (Federal Antimonopoly Service of the Russian Federation, 2017a).
- 49 On 22-23 March 2018, during the ICN Conference representatives of several competition agencies emphasised the role of competition in the current economy, placing an emphasis on competition in the digital world. It was highlighted that, due to digitalization and globalization, competition agencies increasingly have to deal with different types of markets and changing business models. All speakers agreed on the need to conduct market studies to understand digital markets better (ICN, 2018).
- 50 There is no definition of "sign" in the Joint Recommendation Concerning Provisions on the Protection of Marks, and Other Industrial Property Rights in Signs. However, under TRIPS Article 15, signs refer to "words including personal names, letters, numerals, figurative elements and combinations of colours".
- 51 The analysis presented in this subsection updates and extends the scope of analysis of Monteiro and Teh (2017). Besides RTAs notified to the WTO, the analysis also covers newly signed RTAs that have not entered into forced yet and/or not been notified to the WTO, such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Amended Singapore-Australia, European Union-Japan, Colombia-Panama, European Free Trade Association-Gulf Cooperation Council, European Free Trade Association-Philippines, and Republic of Korea-Central America RTAs. Other RTAs analysed include agreed but not signed text, such as the European Union-Singapore, European Union-Viet Nam, and European Union-West Africa

- RTAs. The main text of the RTAs, but also side documents, such as protocols, annexes, communication letters and other documents associated with the RTAs, have been included in the review. Accessions to an existing RTA are excluded from the analysis. Original and amended RTAs have been reviewed separately. The following set of keywords was used to identify provisions related to digital technologies: artificial (intelligence); audio; automat(ion); broadband; computer; cyber; digital; distance; domain; e-(commerce); electronic; emerging; hardware; ICT; Internet; network; on-line/online; paperless; server; software; spam; technical; technolog(y); telecom(munication); web; and wireless.
- 52 Most e-commerce chapters are also covered by the RTA's chapters on general exceptions and on dispute settlement (Monteiro and Teh, 2017).
 - 53 Although they are not reviewed here, the schedules of concessions on ICT-related goods, including those covered in the WTO Information Technology Agreement, established in RTAs also participate in the promotion of digital economy by reducing the cost of goods and equipment necessary to power and use the internet. Similarly, several RTAs include a provision requiring each party to grant duty-free temporary admission of professional equipment, including software, necessary for carrying out the business activity, trade, or profession of a person who qualifies for temporary entry pursuant to the laws of the importing party.
 - 54 Several RTAs also include provisions on standard-related measures relating to the attachment of terminal or other equipment to public telecommunications transport networks. Some of these agreements and a few others establish a committee on telecommunications, sometimes dedicated only to telecommunications standards.
 - 55 Although not reviewed here, a few RTAs include specific provisions on cross-border consumer protection that are not specific to e-commerce. These provisions are often found in a chapter on competition and consumer policy in the relevant RTA.
 - 56 Although not reviewed here in detail, many RTAs include provisions referring more generally to technology, science and innovation. Some provisions address the promotion of technological innovation and transfer and dissemination of technology. Similarly, several cooperation provisions on science, research and technology development require an adequate and effective protection of IP resulting from these cooperative activities.
 - 57 Although not referring explicitly to digital technologies, several recent RTAs incorporate provisions related to collective management societies for copyright and related rights in charge of collecting and distributing royalties. These collective management societies are particularly relevant in the development of digital marketplace for book, music or movie content. Other provisions relevant to digital technologies include provisions related to the legal protection and remedies against camcording (i.e. unauthorized copying of a cinematographic work from a showing in a cinema). A few RTAs also include provisions referring to trade secrets held in computer system.
 - 58 Many RTAs with an IP chapter include a provision defining the scope of IP, which explicitly encompasses copyright in computer programmes and databases.
 - 59 Certain RTAs with an IP chapter do not refer explicitly to any of the "WIPO Internet Treaties" but mention the "agreements administered by WIPO".
 - 60 Many RTAs with an IP chapter include provisions on copyrights and related rights, providing for the exclusive right to authorize or prohibit all literary and artistic works and performances reproductions by wire or wireless means.
 - 61 Software decompilation refers to the process of converting executable programme code into some form of higher-level programming language so that it can be read by a human.
 - 62 Provisions on technological protection measures and right management information have also been negotiated in the Anti-Counterfeiting Trade Agreement (ACTA). Other provisions related to the digital economy include cooperation with the business community and the disclosure of information by online service providers identifying alleged IP infringers. ACTA was signed by Australia, Canada, the European Union, Japan, the Republic of Korea, Mexico, Morocco, New Zealand, Singapore, Switzerland and the United States in 2011. It requires the ratification of at least six signatory parties to enter into force.
 - 63 Several RTAs to which the European Union is a party require the other party to commit to harmonizing its legislation with the EU *acquis* in the audiovisual field, paying particular attention to matters relating to the acquisition of IP rights for programmes and broadcast by satellite, cable and terrestrial frequencies.
 - 64 A couple of RTAs refer also to the need for a clear legal framework for geographical indications (GI) owners wishing to use their GI on the internet.
 - 65 The original TPP included comprehensive provisions, not included in the final version of the CPTPP, many of which idiosyncratic, detailing the framework of legal remedies and safe harbours in respect of online services that are ISPs. Similarly, the parties to the CPTPP have also agreed to suspend the articles on technological measures of protection, information on rights management and protection of satellite signals encrypted cable programme carriers.
 - 66 Although not referring explicitly to digital technologies, several RTAs include a provision committing the parties to review the rules of origin, taking into account the effect on the rules of technological developments, among other factors, which could require amendments to the rules of origin.
 - 67 More generally, the EU-Japan RTA is to date the only agreement to require the establishment of electronic systems for the management of applications for customs actions on goods infringing intellectual property rights, including trademarks.
 - 68 The provision establishing the scope and coverage of the government procurement chapter specifies in several RTAs that covered procurement includes the procurement of digital products.
 - 69 Many RTAs include different provisions specifying the minimum information to be included in notices of intended procurement, tender documentation and post-award notices published electronically.
 - 70 Many other RTAs include provisions on transparency that do not mention the possibility or obligation to publish the information electronically. For instance, several RTAs include

provisions requiring the parties to publish or otherwise make publicly available their respective laws, regulations and other measures of general application pertaining to e-commerce. A complementary but less common provision further commits each party to respond promptly to request by the other party for specific information on any of its measures of general application pertaining to, or affecting the operation of the e-commerce chapter.

- 71 See Crosby (2016).
- 72 See section D.3(b). See also Burri (2017), Wu (2017), Singh et al. (2016), Wunsch-Vincent and Hold (2012) and World Economic Forum (2018a).
- 73 See Hoekman and Mavroidis (2017), Crosby (2016), and Adlung and Mamdouh (2018).
- 73 Substantive harmonization of privacy protection has been the subject of several international arrangements adopted outside the context of trade agreements and which are generally of a non-legally-binding nature.