Digital transformation: Implications for trade policy and economic integration

IIASA project

"Challenges and Opportunities of Economic Integration within a Wider European and Eurasian Space"

Workshop report

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Content

About

IIASA continues a series of thematic workshops in the framework of the research project *"Challenges and Opportunities of Economic Integration within a Wider European and Eurasian Space"*, which aims to discuss, analyze, and critically evaluate diverse issues related to economic cooperation between countries and blocks within the Eurasian continent, covering the European Union, the Eurasian Economic Union, the Eastern Partnership, Central Asia, and their neighbors.

On 2-3 December 2019, IIASA organized a workshop on ***"Connectivity in the Digital Age. Digital Futures of Trade and Economic Cooperation in Eurasia"***, which brought together participants from WTO, OECD, UNCITRAL, DIGITALEUROPE, OeNB and other organizations to discuss the effects of the digital transformation on international trade, as well as on regional and trans-regional integration initiatives.

Specifically, this meeting aimed, inter alia, to overview available estimates of the effects of digital technologies on cross-border trade; to overview the digitalization dimensions of various trade agreements (e.g., USMCA, CPTPP, EU AAs) and to consider their applicability for the countries and blocs of the Eurasian region; to discuss the regulation of digital economy in international legal instruments; to consider various aspects of governance of digital technologies in the cross-border trade (especially in the aspect of big data governance); to review examples of successful digital cooperation in the region; to evaluate broad impacts of digitalization on trade administration (especially *de minimis* trade and taxation issues); and to develop recommendations for deepening digital cooperation in the region.

Related to that, on 6 December 2019, IIASA organized a side event at the 26th OSCE Ministerial Council in Bratislava, Slovak Republic on ***"Futures of international economic cooperation in Eurasia in the times of digital transformations"*** with the participation of high-level representatives from the OSCE, OECD, European Commission and the Eurasian Economic Commission to discuss, among other things, how fair competition can be promoted in the digital economy; how new technologies (e.g., artificial intelligence) will change business models; and how governments can stimulate digital transformation processes in the interests of citizens.

This IIASA report provides a summary of the deliberations from these two events, supported by a review of the most up-to-date literature.

Challenges and Opportunities of Economic Integration within a Wider European and Eurasian Space

From 2013, this IIASA project has been serving as an independent international platform for discussing and analyzing different dimensions of economic cooperation in the region aiming at substantiating plausible future scenarios of how economic ties between the European Union, Eurasian Union, the Eastern Partnership, Central Asia, and their neighbors may develop, and what the risks and opportunities of different developments are. To date, it has enabled a de-politicized science-based dialogue of more than 300 recognized researchers, high-level policymakers and business representatives across the globe; as a part of this activity, 13 reports discussing the state-of-the-art concepts and were produced.

Executive summary

Trends and developments in the global digital trade

- Digitalization is having a major impact on international trade by lowering trade costs, especially transport costs. For example, a 10% increase in "bilateral digital connectivity" can be expected to raise goods trade by nearly 2% and trade in services by over 3%. Until 2030, the cumulated trade cost reductions can reach 11% as a result of technological change.
- Digitalization affects the sectoral composition of trade. Services trade, especially digitally enabled services, will grow from 21% to 25% as a share of the total trade by 2030.
- It is not certain if digital technologies will make global value chains trade more complex, and by now there is no evidence of a significant reshoring trend.
- Digitalization increases the importance of market size, non-tariff barriers, human capital, capital endowment, the quality of domestic business regulation and governance institutions for comparative advantage of countries and blocks.

Defining and measuring digital trade

- Two major ways of defining digital trade still co-exist: one that includes digitally enabled trade of services *and* physical goods, and one that includes only digital services. The OECD would prefer that digital trade should have only one definition, which would include both goods and services. This would facilitate measuring the phenomenon, and, eventually, elaborate evidence-based policy under a common framework.
- Digital intermediary platforms enhance and facilitate digital trade. But digital trade exists even without them.
- National policymakers need to agree on common approaches and standards for measuring digital trade.
- Digitalization intensifies the already occurring blurring of distinction between goods and services.
- It is very difficult to accurately measure digital cross-border trade, since there are different approaches to define what should be included in this phenomenon, and due to the lack of enough and consistent data at the national level. It is a new phenomenon, and as such, new sources should be used and developed to measure it.

Tariff barriers to digital trade

- In 1998, the WTO members have agreed to not impose customs duties on e-commerce transactions (Declaration on Global Electronic Commerce).
- Despite some countries' call for a revoke of this moratorium, it should be upheld and even expanded, since otherwise this could lead to a worldwide tit-for-tat tariff spiral in digital trade which would impair innovation and decrease welfare.

Non-tariff barriers to digital trade

- Digitalization is increasing the importance of non-tariff barriers. These include data localization requirements; technology barriers; technical barriers, e.g., e-signatures; and barriers to internet services, e.g., extensive burdens that internet platforms have to cope with due to their non-IP-related liability for user-generated content and activity.
- National data regulation acts become a factor that can potentially limit digital trade quite significantly. Arguably, one appropriate approach would be to allow free cross-border data flow but at the same time to hold the data exporter accountable for any potential misuse of the data abroad.

- Standardization in the digital economy should be based on the principles of functional equivalence and technological neutrality. Functional equivalence implies that paper-based functions may be replicated by electronic communications or procedures, which may or may not be mirror images of paper-based procedures but fulfil the same legal functions. Technological neutrality implies ensuring that standardization and legislation do not favor any specific technology.
- There are many model laws on various aspects of the digital economy. National and regional regulation should be aligned with multilateral model regulations. International multilateral organizations, e.g., WTO, OECD, UNCITRAL, WCO, should coordinate and harmonize the content of these type laws between themselves.

Smart contracts, blockchain and cryptocurrencies

- Smart self-executing contracts based on decentralized blockchain networks are likely to significantly increase the impacts of digitalization on international trade, especially in terms of transparency of supply chains, trade finance, customs and certification processes, transportation and logistics, insurance, distribution, intellectual property (IP) and government procurement. Cost reduction estimates in the financial sector and the shipping industry range from 15% to 30% of total costs. The removal of barriers due to blockchain could result in more than USD 1 trln of new trade by 2030.
- Traditional cryptocurrencies, e.g., Bitcoin, might still be too volatile to be used on a large scale as payment for trading operations. This, however, might change with Libra by Facebook, which combines the benefits of secure, instant, and global money transfer; the stability of being backed by USD-based assets; and a potentially huge network of 2.7 bln (Facebook) users.

Digital ecosystems, big data, and the Internet of Things (IoT)

- IoT is bound to have a massive impact on supply chains through better monitoring, receiving real time data, decreasing transport costs, optimizing the warehouse logistics and gaining new insights into consumer behavior.
- The effects of IoT are multiplied by big data, predictive analytics, and digital self-controlling ecosystems, which are distributed, adaptive, open socio-technical systems with properties of self-organization, scalability, and sustainability.
- Big American tech companies (Microsoft, Google, Facebook, Amazon, Apple, and Netflix) lead the first wave of the digital transformation and created the existing digital infrastructure. It would be ineffective for other regions of the world, for example, for the European Union, to try to create own regional digital ecosystems. Instead, they could lead the second wave of the digital transformation by creating B2C and B2B applications (APIs) within this existing infrastructure.
- Policymakers can be advised to harmonize data management procedures and conventions; agree on common data sharing templates to support development; develop data strategies to support boundary crossing businesses; and define what types of data resources can be shared.

Platform economies

- Digital platforms usually create significant market power, which can harm the competitive environment and the national economic security. This is due to three key characteristics: network effects, lock-in effects, and economy of scale.
- At the same time, digital platform companies usually spend the most on R&D in comparison to companies from other sectors. E.g., in 2017 the combined research budget of Amazon (USD

16.1 bln) and Google (USD 13.9 bln) was almost double that of Germany's total R&D expenditure (USD 19.3 bln).

- Therefore, potential competition and privacy protection regulation of platform economies should not diminish entrepreneurship, innovation, and the welfare created by digital platforms. Instead, regulation could include four policy measures: transparency about the use of client data; transparency requirements for algorithms; reduction of switching costs between platforms; and enabling the portability of client data.

De minimis trade

- Digital platforms lead to a rise in the overall amount of *de minimis* trade, i.e., of trade of goods and services in very small amounts, usually parcel deliveries to households, which often are exempt from customs duties and are subject to minimal customs clearance requirements. In 2015, e-commerce transactions were estimated at USD 260 bln worldwide, of which 76% are dispatches to domestic households.
- *De minimis* trade offers an important opportunity for SMEs to sell on foreign markets. For example, in the US, 97% of small businesses export abroad using eBay, in contrast with only 4% who export without selling through the internet. Governments can support these SMEs by reducing procedural burdens and by streamlining administrative procedures for handling parcels at the border, e.g., international cooperation between border agencies, creating single window systems, better risk management and identifying trusted digital platforms, digital tracking of goods.
- At the same time, digitally enabled parcel trade can be a major source of under-recording of trade. Digital platforms, by serving huge markets without a physical presence and by being registered in tax havens as well as through *de minimis* trade can lead to major forgone losses in tax and customs revenues for the countries where they operate.
- Digital taxes based on the “market land principle”, i.e., taxing digital companies abroad based on their market size, could potentially return these revenues, e.g., EUR 3 to 4 bln annually in the case of the EU. However, the introduction of such taxes may lead to retaliatory measures, e.g., penalty tariffs; may hurt export-oriented economies if implemented globally; and may reduce potential investments in R&D. Instead of a new digital tax, double taxation agreements between countries could be better coordinated to tackle tax-avoidance practices.
- *De minimis* trade could be taxed by obliging e-commerce platforms to add the relevant VAT by themselves on all the goods, which they sell to a certain a country. Enforcement can be aided by identifying trustworthy e-platforms in terms of tax compliance.

Digitalization and regional trade agreements

- Digitalization increases the benefits that can be drawn from regional trade agreements (RTAs). Empirical evidence suggests that, when combined with an RTA, a 10% increase in digital connectivity increases exports by an additional 2.3% on average.
- AI might be used to improve trade negotiations by better predicting economic and trade trajectories of each negotiating partner under different assumptions. Moreover, AI can be used to pinpoint areas or activities for common development.
- Digitalization reduces the relative relevance of tangible goods and customs borders while increasing the relative significance of services, non-tariff barriers (NTBs), the business climate, and governance institutions. Regional integration blocs thus need to focus even more on the elimination of NTBs and achieving a truly single domestic market. Apart from the traditional trade and tariff policy, more emphasis needs to be put on harmonizing and liberalizing the digitization in such areas as:

- Trade in services: e.g., intellectual property rights, best practice regulations on interconnections among network operators, liberalization of cross-border data flows, banning data localization requirements, liberalization of e-commerce requirements;
- Technical regulations: e.g., mutual recognition of e-signatures and encryption methods;
- Cross-border competition policy and anti-trust law: e.g., abolition of commercial or local presence requirements, as well as of mandatory use of local software, and the creation of effective dispute settlement mechanisms for e-commerce;
- Labor mobility: e.g., e-visas and favorable treatment for skilled IT-specialists;
- Taxation: e.g., setting a standard *de minimis* threshold, online tax registration and declaration for non-resident firms;
- Financial market: e.g., enabling access to digital payment methods, harmonization of security standards for payment transactions;
- E-government: e.g., digitization and mutual access of public procurement, intergovernmental acceptance of e-documents;
- Customs control: e.g., digital single window systems;
- SME support: e.g., creation of pan-regional open business e-registries and e-maps;
- Industrial policy: e.g., creating a shared big data database for companies.

- The regional single domestic (digital) market should not be protectionist in relation to foreign digital firms.
- In the digital economy, a larger consumer market size due to regional economic integration can be an important asset in trade negotiations with third parties.

Free trade vs. protectionism in the digital age

- In the digital age, free trade is becoming even more important factor for success, innovation, and welfare gains. In this context, the "Data Free Flow with Trust" (DFFT) agenda on facilitating open data flows and rules-based digital trade proposed by Japan in 2019 should be supported by the international community.
- The potential costs and benefits of exceptions of digital free trade, such as those due to the infancy-of-industry argument for countries that need to catch up with the technological frontier; safeguarding national economic security; and protection of private data, need to be carefully analyzed in each case.
- International comparisons of digital restrictiveness should be subject to independent scrutiny.

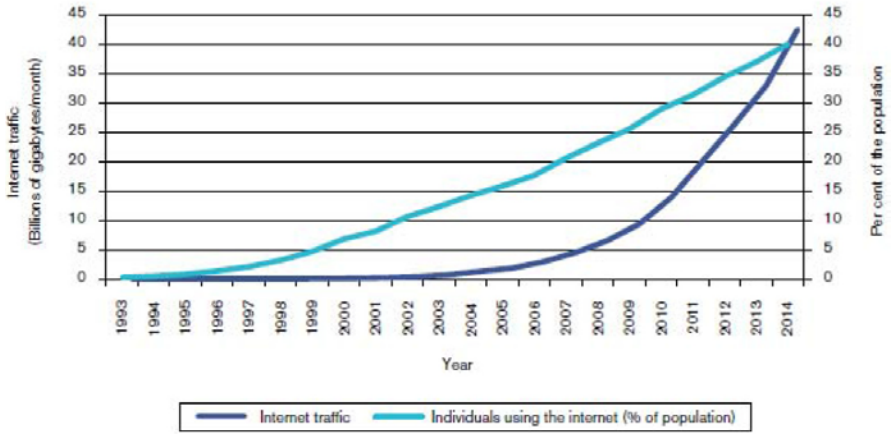
I. Trends and developments in the global digital trade

There are different mechanisms through which digital technologies are increasingly affecting international trade. This transformation has a distinct impact on existing and future international trade cooperation. As the global internet develops and evolves, digital trade has become more prominent on the global trade and economic policy agenda.

Currently there are 4.4 bln internet users in the world, and 0.4 bln new users joined only in 2018-19. By 2022, over 60% of the global GDP will be digitized. Around 70% of the new value created in the economy during the 2020s will involve digitally enabled platforms. Free data flow is forecasted to contribute USD 11 trln to the global economy by 2025. By then some 0.9 bln people will have international connections on social media and around 0.4 bln will take part in cross-border e-commerce (Hotak, 2019).

Within 20 years, between 1994 and 2014, the internet traffic increased by almost 45% and the number of individuals as percentage of the global population using the internet increased by 40% (Chart 1, Bacchetta, 2019).

Chart 1. Global internet traffic and internet usage (1993-2014)

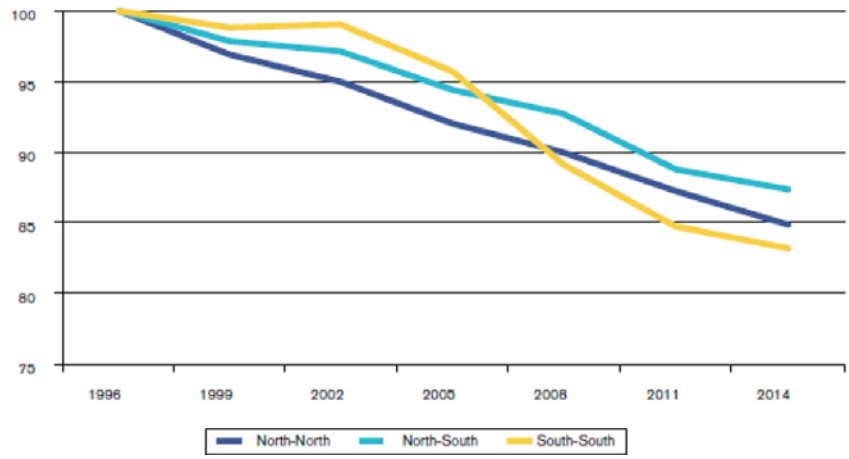


Source: (Bacchetta, 2019).

There are several ways how digital transformation has affected international cross-border trade.

First of all, digital technologies have helped lower trade costs, which between 1996 and 2014 were reduced by ca. one-fifth (Chart 2, Bacchetta, 2019). Digital trade is also transforming global supply chains. Because of the vastly enhanced ability to communicate global companies are able to coordinate delivery times, track inventory, and reduce losses in shipment. The use of "digital wrappers", such as radio-frequency identification (RFID) tags, allows companies to track the time and location of goods throughout the supply chain. Adoption of the blockchain technology is reducing the cost of financing trade while facilitating "just in time" inventory and reducing customs delays at ports.

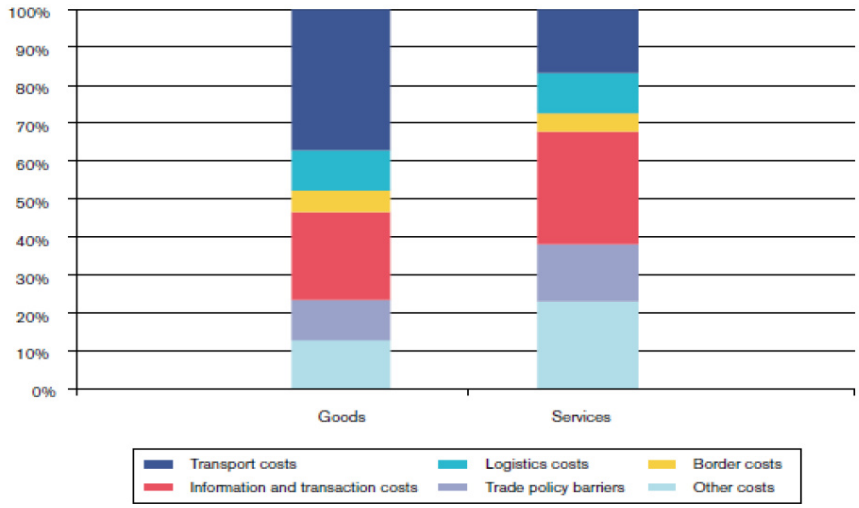
Chart 2. Trade costs (1996-2014, in %, 1996 = 100%)



Source: (Bacchetta, 2019).

In particular, digital technologies helped in lowering transport costs which accounts for a large share of the overall trade costs (Chart 3, Bacchetta, 2019). A 10% increase in "bilateral digital connectivity" raises goods trade by nearly 2% and trade in services by over 3%.

Chart 3. Structure of trade costs (2011, in %)



Source: (Bacchetta, 2019).

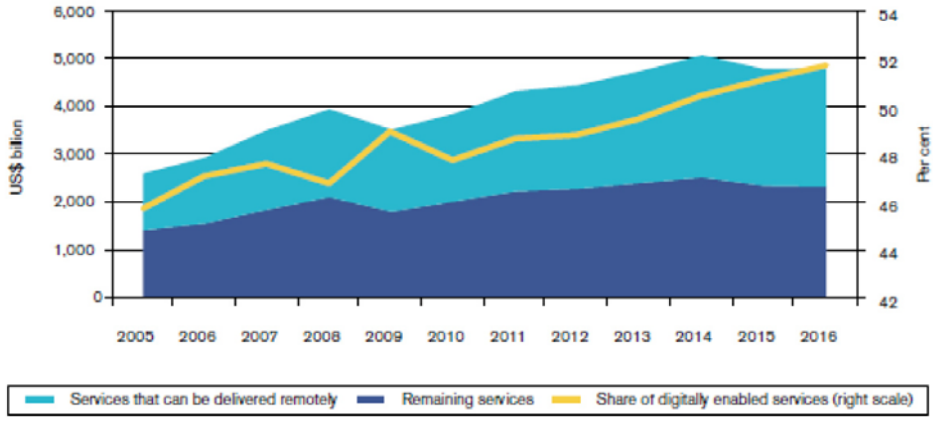
Digitalization also decreases other trade costs including the search costs for matching buyers and sellers by enabling easier access to information, and transaction costs by facilitating customs procedures and cross-border payments.

Until 2030, the cumulated trade cost reductions could reach 10.5% as a result of the technological change. Trade growth could be 31 to 34 p.p. larger as a result of the falling trade costs (Bacchetta, 2019).

Secondly, digitalization affects the sectoral composition of trade. Services trade (especially of digitally enabled services) will grow in importance from 21% to 25% of total trade by 2030 (Bacchetta, 2019).

Trade in time-sensitive, certification-intensive, and contract-intensive goods will increase. Between 2005 and 2016 the share of digitality enabled services in total services trade already increased by 8 p.p. from 46% to 52% (Chart 4, Bacchetta, 2019).

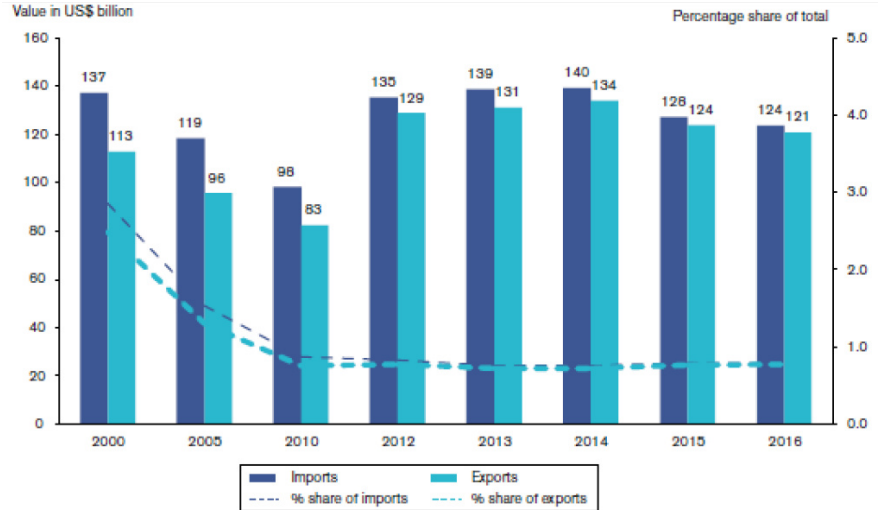
Chart 4. Share of digitally enabled services in global services trade (2005-2016)



Source: (Bacchetta, 2019).

Trade in digitizable goods (e.g., books to e-books) is also likely to continue declining. Between 2000 and 2016, its share in the overall commodity trade decreased from ca. 3% to less than 1% (Chart 5, Bacchetta, 2019).

Chart 5. Global trade in digitizable goods (2000-2016)



Source: (Bacchetta, 2019).

Digital technologies are likely to affect the nature, complexity, and length of the global value chains (GVCs) in the future, but it is hard to predict whether digital technologies will shorten or lengthen GVCs. To date, there is no evidence of a significant reshoring trend (Bacchetta, 2019).

Digital trade is not changing the "why" of trade, which is still driven by the comparative advantage and other factors that economists have studied for decades, but it is transforming the "how." The age of the digitally enabled trade is not just about digitally delivered trade, it is also about traditional physical trade enabled by the growing digital connectivity which increases the access to foreign markets for firms in a way that would previously have been unimaginable (González et al., 2017).

Skills and capital endowment, market size or the quality of institutions are likely to become more important determinants of comparative advantage. Physical infrastructure, border processes, and geographical factors might become less relevant. Thus, the regulation of the intellectual property rights, data flows, and privacy are likely to become important determinants. Concurrently, barriers to digitally enabled services, which form the backbone of digital trade transactions, are growing.

II. Defining and measuring digital trade

Problems of definition

Digital trade can take many forms, ranging from video streaming to ordering merchandise through online platforms, which makes a precise definition of the digital trade a complex subject. Generally, there are ***two main ways of defining digital trade***: one that includes physical goods and one that does not, or, in other words, digitally enabled trade and digital trade "*sensu stricto*" (Chazerand, 2019).

The first approach encompasses digitally enabled transactions in trade in goods and services that can be digitally or physically delivered. This includes digitally delivered software, e-books, data, or database services; and digitally enabled but physically delivered goods and services, such as a purchase of a good on an online marketplace or a hotel booking through a matching service. Digitally enabled trade involves business-to-business transactions, including those within GVCs, as well as transactions between consumers or businesses through online platforms. All of these transactions are underpinned by data, which is the lifeblood of the digital trade.

The second approach also puts emphasis on electronic platforms as enablers of digital trade. However, it narrows down the definition to include only trade in electronic products, i.e., data flows, which have been digitally delivered, e.g., e-books, software, database services.

Digital platforms or marketplaces – so called ***digital intermediary platforms (DIP)*** – do not enable digital trade *per se*, but rather act as enablers for some agents of digital trade.

The ***OECD defines*** digital trade according to *what* is traded*, how* it is traded and *who* is trading.

"How", i.e., the nature of the transaction, includes the following aspects:

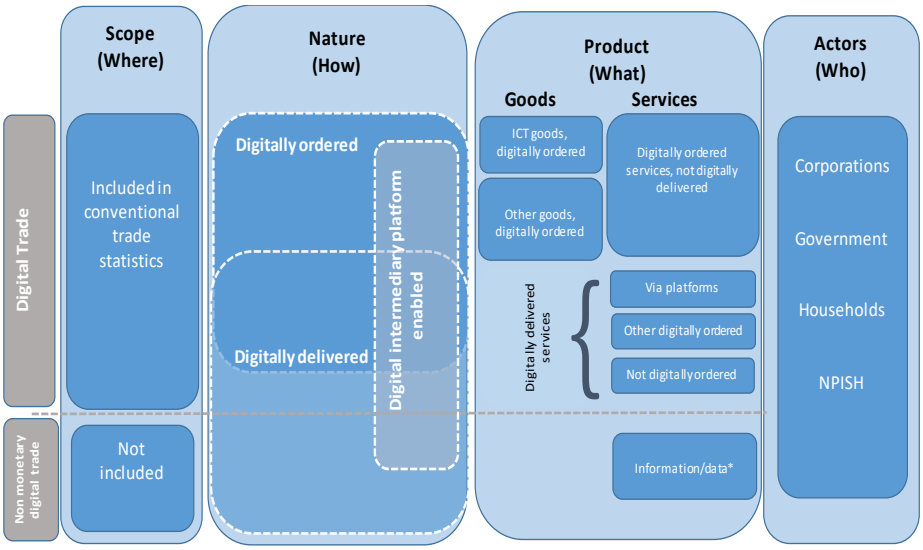
- Digitally ordered: The sale or purchase of a good or service, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders (follows the OECD's e-commerce definition).
- Platform enabled: Transactions that are facilitated via online intermediary platforms that match buyer and supplier (e.g., eBay, Amazon, Uber); platform may be based domestically or abroad, be foreign or domestically owned.
- Digitally delivered: 'downloadable' services and data flows (software, data, database services, etc.).

Thus, the OECD adopts a wider definition of the digital trade as all trade that is digitally ordered and/or digitally delivered (Graphic 1; OECD, IMF, WTO, 2019).

According to a publication from 2017 by the ***United States International Trade Commission (USITC)***, digital trade is the delivery of products and services over the internet by firms in any industry sector, and of associated products such as smartphones and internet-connected sensors. While it includes provision of e-commerce platforms and related services, it excludes the value of sales of physical goods ordered online, as well as physical goods that have a digital counterpart (such as books, movies, music, and software sold on CDs or DVDs). Thus, it also follows the narrower definition of the digital trade (Flegontova, 2019).

According to the ***WTO's Declaration on Global Electronic Commerce*** (1998), e-commerce is the production, distribution, marketing, sale or delivery of goods and services by electronic means. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organizations (Flegontova, 2019).

Graphic 1. The digital trade framework according to the OECD



Source: (OECD, IMF, WTO, 2019).

Digitalization not only facilitates the rise of services in the international cross-border trade. More services are becoming tradable as well. Therefore, another defining feature of the digital trade is that it also intensifies the already occurring ***blurring of distinction between goods and services***. For example, selling a smart fridge as a good includes also the provision of the embedded service. Or, an article produced by means of the 3D printing may cross a border as a design service, but then becomes a good at the moment of its consumption. Together, these issues pose new challenges for the international trade and investment policy.

This increasing blurring between goods and services make it necessary to update or clarify the existing trade rules and commitments. Trade rules are traditionally predicated on identifying whether products are goods or services and the borders they cross. But, in the digital era, these distinctions may not always be clear-cut. Firms are now increasingly able to flexibly operate from different locations and to bundle goods with services, making it difficult to identify the particular trade rules that apply to specific transactions. In these new conditions, regulation of the digital commerce through a tariff policy is fading into the background, and harmonization and reduction of non-tariff barriers and the development of the institutional environment are becoming increasingly important.

Measuring digital cross-border trade

Internationally comparable estimates of the digital international trade were rather limited, in particular because there was still no consensus on what exactly the digital trade is. To respond to this lacuna, various international statistical, trade, and digital policy organizations have developed different conceptual and measurement frameworks for measuring digital cross-border trade, e.g. the OECD-IMF-WTO Handbook on Measuring Digital Trade (2019). Such efforts better capture the digital trade in the official national trade statistics, yet it will take some time before robust measures are more widely adopted. Analysis has to proceed carefully, using existing statistics to shed light on particular aspects of trade in the digital era (Ostolaza, 2019).

One challenge is to properly measure digital imports and exports, which is difficult but necessary to evaluate the impacts of the digital trade in other areas. Here, in regard to the above mentioned definition problems, the question arises: what is to be measured (e.g., the size of e-commerce, the size of transactions delivered digitally, the share of added value- provided by "digital industries", the size of digital goods and services as a share of GDP); what is the value of data; what is the size of investment in digital tools? All of these are different and important aspects of the digital trade.

As for the information sources, on the one hand, primary surveys should be used, in which companies and associations in a sector can be asked to submit company and market data directly via requests for information or decisions. Master data registers (e.g., locations, contact information, company form, geodata, etc.) can also be used (Ostolaza, 2019). There are multiple challenges, including the following:

- Enterprise surveys focus almost exclusively on measuring the scale (and size) of e-commerce transactions in the economy as a whole and not the cross-border dimension.
- Household surveys are a good source for digital intermediary platform (DIP) information. However, respondents are not able to accurately determine if a transaction is cross-border because many platforms or online sellers appear to have a domestic presence.
- Using credit card data is a promising area for B2C cross-border transactions and rather cost effective, however, privacy protection regulations need to be followed.

On the other hand, secondary sources offer the opportunity to get a comprehensive market overview. These include industry statistics, databases, specialist media, special search engines, directories, press releases, and professional research in the sense of web analysis. The use of information service providers with a specific industry focus may also be suitable in order to obtain relevant market information (Ostolaza, 2019). The following can be noted in this context:

- International Trade in Services Statistics (ITSS) surveys are currently the best existing vehicle to develop estimates of digitally delivered trade in services. However, they struggle to capture household-to-household transactions, in particular, *de minimis* trade facilitated by DIPs.
- International Transaction Reporting System (ITRS) allows to estimate digitally delivered services, at least for large enterprises that are known to provide these services, e.g., Facebook or Google.
- Mini One-Stop-Shop (MOSS) data: Because of its focus on digitized services, data derived from MOSS has already been explored to measure digital trade transactions in Hungary and Denmark.

III. Effects of digitalization on trade policy and economic integration

Tariff barriers to digital trade

In 1998, the World Trade Organization (WTO) members have agreed not to impose ***customs duties*** on electronic transmissions. While the term "electronic transmissions" is not defined by the WTO, it is mainly intended to deal with services and thus commonly held to encompass anything from software, emails, and text messages to digital music, movies, and videogames. The moratorium on the digital trade is worth an estimated USD 225 bln a year (Reuters, 2019).

The moratorium is not set in stone: every two years, at the biennial WTO Ministerial Conference, governments agree to extend it. Last time, in December 2019, the members agreed to renew the moratorium for another six months.

Several countries, including India and South Africa, have expressed interest in lifting the moratorium, as they develop their digital economies and seek to recuperate lost customs revenue as more trade is becoming digital. However, this may lead to tit-for-tat tariffs on the internet. According to one study, India and South Africa would actually lose from the global imposition of tariffs on electronic transmissions: the GDP losses for India, South Africa, and China are estimated at USD 1.9 bln, 25 mln, and 0.6 bln respectively (Makiyama et al., 2019).

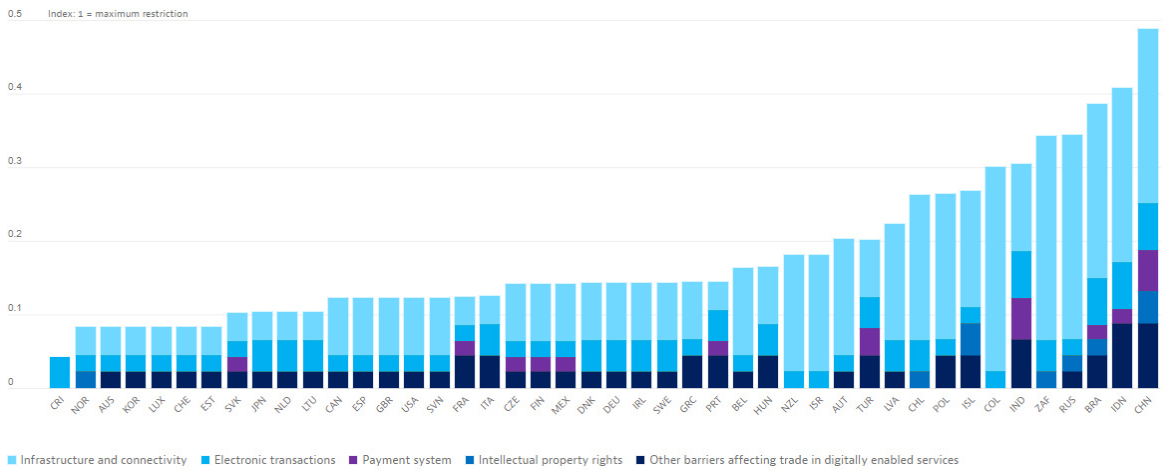
Non-tariff barriers to digital trade

As already mentioned above, the nature of digital transformation reduces the importance of tariff policies — both in relation to goods and in relation to data flows. In the latter case, according to the aforementioned WTO moratorium, tariff duties are, as for now, prohibited. At the same time, non-tariff barriers and regulation of the economy are becoming increasingly important. In this regard, policymakers need to address ***non-tariff barriers (NTBs) to digital commerce***.

One method to quantify NTBs has been developed by the OECD's in its "Digital Services Trade Restrictiveness Index" (DSTRI), which identifies, catalogues, and quantifies cross-cutting barriers that affect trade of digitally enabled services across 44 countries, with data available for every year for the period 2014-2018. Non-tariff measures included relate to: infrastructure and connectivity, electronic transactions, e-payment systems, intellectual property rights, and other barriers to trade in digitally enabled services. The DSTRI is a composite index which takes values between 0 and 1, where 0 indicates an open regulatory environment for digitally enabled trade and 1 indicates a completely closed regime.

The 2018 data show that the BRICS countries are the most restrictive to a free digital trade. Major barriers in most countries are found in the field of infrastructure and connectivity; these are restrictions related to the interconnection of communication infrastructure and restrictions affecting connectivity, e.g., measures affecting cross-border data flows (Chart 6, OECD, 2019 a).

Chart 6. Digital Services Trade Restrictiveness Index (DSTRI, 2018)



Source: (OECD, 2019 a).

The U.S. Trade Representative (USTR) has developed another approach to distinct non-tariff barriers to digital trade by dividing them into four broad categories (USTR, 2017):

- Data Localization Barriers: Including unnecessary requirements to store data within a particular jurisdiction or situate computing facilities locally, as well as outright bans on cross-border data flows.
- Technology Barriers: Including requirements to meet onerous and unnecessary security standards and requirements to disclose encryption algorithms or other proprietary source code.
- Barriers to Internet Services: Including inappropriate application of old regulatory regimes to new business models and unreasonable burdens on internet platforms for non-IP-related liability for user-generated content and activity.
- Other Barriers: Including issues surrounding electronic authentication and signatures, internet domain names, digital products, electronic payment platforms, as well as other discriminatory practices.

As part of both approaches, ***data regulation*** has become a significant element of potential restrictions to digital trade. In this regard four broad stances to regulating cross-border data flows are emerging:

- At one extreme, there may be no regulation of cross-border data flows, usually because there is no data protection legislation at all (largely in the case of the least developed countries). While this implies no restrictions on the movement of data, the absence of regulation might affect the willingness of others to send data.
- The second approach neither prohibits the cross-border transfer of data nor does it require any specific conditions to be fulfilled in order to move data across borders; it requires instead ex-post accountability of the data exporter if data sent abroad is misused.
- A third approach conditions the flow of data by permitting transfers only to countries that have either received an adequacy determination (i.e., a public or private sector confirming that the standards of privacy protection in the receiving country are adequate); and/or where appropriate private sector safeguards, such as contractual mechanisms, are provided; or in the case of some narrow exceptions.

- The last broad type of practice relates to systems that only allow data to be transferred on a case-by-case basis subject to a review and a somewhat discretionary approval by relevant authorities. This approach relates to personal data for privacy reasons but also to a more sweeping category of data referred to as “important data” included in the context of national security.

These are not mutually exclusive — different approaches can apply to different types of data even within the same jurisdiction. Health data, for instance, might be subject to more stringent procedures than data related to product maintenance.

Technical standards are also becoming a key part of the digital trade regulation. However, it is important to keep in mind that organizations may have individual agendas to push their standards or disparage others. Some IT companies will make a living from complicated data exchanges, so it may not be in their interest to have an interoperable system. This is sometimes the case for certain governments or government administrations as well. Nevertheless, as more and more trade and international business processes move online, ensuring interoperability and interconnectivity between systems becomes even more important.

Different institutions at the multilateral and regional levels are involved in the creation of these international technical standards. Because of the division of responsibilities within government bureaucracies, some trade policymakers are not necessarily aware of the work of other officials within their own government in establishing these technical standards despite the fact that the creation of such standards will inevitably impact traders.

In this regard, there are still many different approaches to the standardization of the data streams, to their storage, coding, application within the framework of the interface, etc. Nevertheless, it is important that they all adhere to two principles (Castellani, 2019):

- The principle of functional equivalence, which implies that paper-based functions are replicated by electronic communications or procedures, which may or may not be mirror images of paper-based procedures but fulfil the same legal functions.
- The principle of technological neutrality, which implies ensuring that standardization and legislation do not favor any specific technologies.

An important example of technical standards in digital trade are electronic signatures, or ***e-signatures***, which is data in the electronic form logically associated with other data in the electronic form and which is used by the signatory to sign. This type of signature provides the same legal standing as a handwritten signature as long as it adheres to the requirements of the specific regulation it was created under, e.g., eIDAS in the European Union, NIST-DSS in the USA, or ZertES in Switzerland.

Standardized electronic data messaging language maintained by the UN agencies can enable countries to exchange electronic SPS certificates for agriculture products or communicate laboratory results in the agri-food industry. The International Plan Protection Convention (IPPC) multilateral treaty under the UN Food and Agriculture Organization (FAO) is developing a globally harmonized approach for electronic phytosanitary certificates exchange – used to check the quality of food products – that will use UN e-business standard.

Type laws for the digital economy

In the quarter century of its existence, the World Trade Organization (WTO) has developed many international treaties and model agreements that either partially or fully relate to aspects of the digital commerce (Malkawi, 2019).

The ***General Agreement on Trade in Services (GATS, 1995)*** is of a particular significance to the digital trade for several reasons. The communication services, which provide access to the digital trade fall under the GATS. GATS covers many sectors and modes of delivery whether the mode is traditional or electronic. Indeed, it was determined that GATS was technologically neutral. The execution of an electronic transaction necessitates infrastructure services (distribution, payment, etc.), whose liberalization equally falls under the GATS. In view of the acknowledged importance of telecommunication services, the access to the public telecommunication networks was incorporated in a separate telecommunication annex.

With the ***Information Technology Agreement (ITA, 1997)*** WTO members agreed to a common position with regard to trade in information technology (IT) goods. WTO members committed themselves to reach the aforementioned tariff-free policy. This obligation pertains to a common list of IT-products covering a wide range of some 180 information technology products in five major categories: computers and peripheral devices, semiconductors, printed circuit boards, telecommunications equipment (except satellites), and software. By 2015, the ITA covered 95% of the existing world trade in IT-goods. Thus, the ITA brings advantages to a wide range of production activities (Chazerand, 2019).

The ***Trade Facilitation Agreement (TFA)***, a multilateral deal that entered into force in February 2017, contains a number of provisions potentially relevant to digital trade. These refer to the electronic exchange of data and documents, the electronic submission of trade related documents, e-payment systems, electronic single window systems, and international standards for paperless trade. Estimates suggest that a full implementation of the TFA – which includes but goes beyond paperless trade administration provisions – could reduce trade costs by an average of 14.3% and boost the global trade by up to USD 1 trln a year (WTO, 2015).

The ***Customs Valuation Agreement (CVA, 1994)*** expressly requires customs to include 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" in the customs value. Thus, 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. E.g., all things being equal, if a 3D printed object is imported into the country where the 3D 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.

The ***Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS, 1995)*** for the first time introduced intellectual property rules into the multilateral trade. TRIPS plays a critical role in facilitating trade in knowledge and creativity and in resolving trade disputes over the intellectual property. This agreement is a legal recognition of the significance of the linkage between intellectual property and trade.

In December 2017, 71 WTO member-countries announced a new work program aimed to substantiate future WTO negotiations on trade-related aspects of the electronic commerce, with the participation open to all WTO members.

As already mentioned, in the context of digital transformation, the domestic national legislation is becoming ever more important for the regulation of cross-border digital trade. In this light, the United

Nations Commission on International Trade Law (UNCITRAL) is a major international institution that develops model laws in the field of digital commerce. For more than two decades, UNCITRAL type laws have been enabling the use of electronic means in all fields of commerce in more than 100 countries and are increasingly referred to in free trade agreements (Castellani, 2019).

Adopted in 2001, the ***Model Law on Electronic Signatures (MLES)*** gives an additional legal guidance on the use of electronic signatures. The MLES follows a technology-neutral approach, which avoids favouring the use of any particular product. It establishes basic rules for assessing possible responsibilities and liabilities for the signatory, the relaying party, and the trusted third parties intervening in the signature process.

Adopted in 1996, the ***Model Law on Electronic Commerce (MLEC)*** is intended to enable the use of the modern means of communication and storage of information. It is based on the establishment of a functional equivalence in the electronic media for paper-based concepts, such as "writing", "signature", and "original". It also establishes rules for the formation and validity of contracts concluded electronically.

Adopted in 2017, the ***Model Law on Electronic Transferable Records (MLETR)*** legally enables the use of electronic transferable records that are equivalent to documents or instruments incorporating the right to deliver goods or payment (bills of lading; bills of exchange; warehouse receipts; promissory notes). It is technology- and model-neutral and supports the paperless trade facilitation by allowing issuance of a single electronic record replacing transport, finance, and customs documents.

All of the above listed agreements and type laws applied to those countries that have voluntarily adopted and ratified them.

The UNCITRAL Secretariat has been tasked by its 60 member-states to compile information on legal issues of the digital economy. Here, several lines of enquiry have emerged: the rights of parties to data transactions; the tokenization of assets using distributed ledger technology; the legal validity of actions of artificial intelligence systems and associated liability; the use of technology in dispute settlement in technology-related matters. Suggestions for future work include the taxonomy of emerging technologies and applications to facilitate a common understanding of legal issues.

Virtual single windows

According to the Centre for Trade Facilitation and Electronic Business (UN/CEFACT), a ***single window*** is a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements. Many countries are developing single windows that serve as one simple point of entry for submitting regulatory documents and other supporting evidence when merchandise is imported or exported. Almost all single windows implemented today are electronic systems with a web-based interface. As such, running an electronic single window usually requires the ability to process electronic message exchanges (UN/CEFACT, 2005).

Implementing paperless trade and electronic single window systems can contribute to improving a country's international commercial-enabling environment, encouraging business activity, in turn driving economic growth and development. In Senegal, for instance, the implementation of the electronic single window reduced the border preclearance and clearance processing time by 90%, from an average of two weeks to just one day. The cost of border processes has decreased by 60%, while the streamlined system has allowed the border agencies to reassign staff to other priority areas. In Costa Rica, the Inter-American Development Bank finds that the implementation of the electronic single window increased exports by 2% a year in 2007-2013. Looking at the cost-benefit analysis,

approximately USD 1.7 mln invested in the single window system translated into a twentyfold gain in terms of increased exports and reductions in public administration costs in 44 countries. (WEF, 2017).

In 2017, the United Nations (UN) conducted a survey of 120 countries across a range of 38 measures related to the trade facilitation and paperless trading. From a subset of factors relevant to all surveyed countries, an average implementation score was derived, with score of 100% corresponding to a full implementation across all factors. The average implementation rate of trade facilitation and paperless trade measures was 61%. This figure reflects a steady improvement over the previous years but also highlights the degree to which most countries have to implement the full range of possible measures (UN, 2017). On the other hand, only about 34% of the countries have implemented measures related to the cross-border exchange of electronic data and documents. And only about 40% of upper-middle income countries have a single window system in place, while this figure is 20% for lower-middle income countries and less than 10% for low-income countries (WEF, 2017).

Smart contracts, blockchain, and cryptocurrencies

A ***smart contract*** is a self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of a computer code. The code and the agreements contained therein exist across a distributed, decentralized ***blockchain*** network. The code controls the execution, and transactions are trackable and irreversible. The blockchain code also enables the automated execution of a part or of the whole contract. The above mentioned MLETR type law defines blockchains as a possibility to include dynamic information generating from oracles (Castellani, 2019).

Blockchain's potential trade-related applications are numerous and could significantly transform international trade. They include trade finance, customs and certification processes, insurance, distribution, intellectual property (IP), government procurement, transportation and logistics, as well as transparency of supply chains.

Although it is difficult to assess the extent to which the deployment of blockchain technology will affect trade costs, preliminary indications at hand tend to suggest a notable impact. Cost reduction estimates in the financial sector and the shipping industry range from 15% to 30% of the total costs. According to the World Economic Forum, the removal of barriers due to blockchain could result in more than USD 1 trln of new trade by 2030 (Ganne, 2018).

The emergence of smart contracts creates the need to review their impact on major multilateral trade agreements, e.g., the UN Convention on Contracts for the International Sale of Goods (CISG). The Model Law on Electronic Transferable Records, on the other hand, is compatible with smart contracts since it is based on the principle of technology neutrality. It also provides a guidance on the blockchain implementation in its Explanatory Note (Castellani, 2019).

The possibility of integrating smart contracts into blockchain has opened the door to cryptocurrencies. A ***cryptocurrency*** is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend. Many cryptocurrencies are decentralized networks based on blockchain technology — a distributed ledger enforced by a disparate network of computers. A defining feature of cryptocurrencies is that they are generally not issued by any central authority, rendering them theoretically immune to government interference or manipulation. Even though the full scale of use of virtual currencies is unknown, its market value has been reported to exceed EUR 7 bln worldwide (Houben et al., 2018)

One, however, should not expect that in the near future a significant proportion of traders will switch to cryptocurrencies for payment of export-import transactions. A major reason for this is the fact that the value of a cryptocurrency is not backed by any traditional asset and thus can be subject to significant and unexpected price, and subsequently, exchange rate fluctuations. These fluctuations

could, but do not have to, be the result of involvement in a Ponzi scheme or the build-up of a price bubble. Another reason of a relatively high exchange rate volatility is the small size of the most cryptocurrency markets, resulting in the insufficient liquidity.

However, in June 2019, a group of 28 Facebook-led companies published a white paper proposing the introduction of a new cryptocurrency called Libra. The group promises "a stable currency that is based on a secure and stable open source blockchain, which is covered with (USD-based) assets and is managed by an independent association". Therefore, as opposed to non-asset-backed cryptocurrencies, Libra could become attractive for future international trade for three reasons: (1) it offers inexpensive peer-to-peer money transfers of any amount and independent from geographical distance; (2) it offers a stable instrument for storing value with a little risk from exchange rate fluctuations in the reserve basket compared to third currencies (albeit without interest); (3) it could evolve into a unit of account if suppliers using global trading platforms choose to price their goods in Libra. Thus, within the Libra network, the exchange rate risk associated with overseas transfers would disappear along with overcoming the problem of a lack of a bank account. The liquidity risk, although to a lesser extent, would remain.

Considering that Facebook and its subsidiaries already have around 2.7 bln users and other payment systems such as Visa and Mastercard together have "only" 1.6 bln users, many of whom are Facebook users, the customer potential for Libra is much above that of the existing currencies (Mayer, 2019).

Digital ecosystems, big data, and the Internet of Things (IoT)

The ***Internet of Things (IoT)*** is a system of interrelated computing devices, mechanical and digital machines or objects that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The definition of the Internet of Things has evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of Things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", covering devices and appliances, such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances, that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers.

In 2017, the IoT included over 8.4 bln connected "things" (Gartner, 2017), and all markets that made up the IoT spent a combined USD 235 bln. It is projected that this figure will reach USD 520 bln in 2021 (Forbes, 2018).

As stated above, the global value chains are becoming, on average, more fragmented to the extent that some researchers have renamed them into global value networks. In 2013, already more than a half of the OECD's manufacturing imports were intermediate goods, while more than 70% of the services imports are intermediate services, e.g., business services (OECD, 2013). The Internet of Things is bound to have a massive impact on supply chains. Firstly, with the use of IoT technologies, information tracking can be better performed while an object is in transit. Data can be gathered from cloud-based GPS as well as using a radio-frequency identification (RFID) technology, more accurately determining where the object is at any particular moment of time. More crucially, data can be extracted to determine what state the object is in. Temperature and condition can be monitored in-transit. RFID chips can collect such data and send it to the cloud in real time.

Secondly, more knowledge of the supply chain can help the traders minimize their losses. For example, the fuel costs can be cut significantly, because the IoT allows to monitor traffic conditions and adjust routes accordingly. It is estimated that annually over 30% of food perishes while in transit. By being able to better monitor the temperature while the product is in transit, this spoilage can be reduced. Fleets can also be made more efficient by reducing deadhead miles. In addition to monitoring data while a product is in transit, IoT technologies allow supply chain leaders to optimize the warehouse environment. Warehouse space can be better optimized if the information on which products are shifting faster is available, which also makes it easier to plan production.

Thirdly, with sensors embedded in products, manufacturers can benefit from new insights regarding the consumer behavior. This in turn can lead to better products and services to suit customers' needs. Data is transmitted in real time with sensors, so there is no lag in adjustments.

The growth of the Internet of Things, artificial intelligence and digital platforms has expanded the possibilities for collecting, processing and applying big data. Currently, the notion of ***big data*** tends to refer to the use of the predictive analytics, user behavior analytics, and other advanced data analytics methods that extract value from data, especially from large and diverse sets of information that grow at an ever-increasing rate. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered – the 3Vs of big data. Big data often comes from multiple sources and in multiple formats.

The above listed effects of IoT may thus be multiplied by big data and predictive analytics, which enable companies to optimize logistics, forecast demand more accurately or better time their product launches. This will have implications for almost all sectors, from industrial products to entertainment. General Electric, for example, has created a large database on industrial machines. According to the company, its monitoring center is able to predict some 200+ equipment failures a month, thereby reducing unplanned downtime (Kohen, 2015).

In case of Amazon, both the data from own transactions and partner ecosystems are collected and evaluated. Some of the insights informed the establishment of new platforms such as Amazon Music or Amazon Cloud. Some other insights are also used in Amazon Prime and supplemented with AI solutions, for example to combine the buying behavior of a target group in a specific region with weather data and media news, in order to predict inclinations to purchase a specific good. This allows for targeting the products and for dynamic aligning the supply chains with the potential future purchases (Hosseini et al., 2018)

AI-based translation services empower digital platforms as drivers of international trade. For example, as a result of the introduction of a machine translation service, eBay-based exports to the Spanish-speaking Latin America increased by 17.5% and the value increased by 13.1%. For comparison, a 10% reduction in the distance between countries is correlated with an increased trade revenue of 3.51%. So, a 13.1% increase of the revenue from the machine translation is equivalent to a reduction of the distance between countries by over 35% (Brynjolfsson et al., 2018)

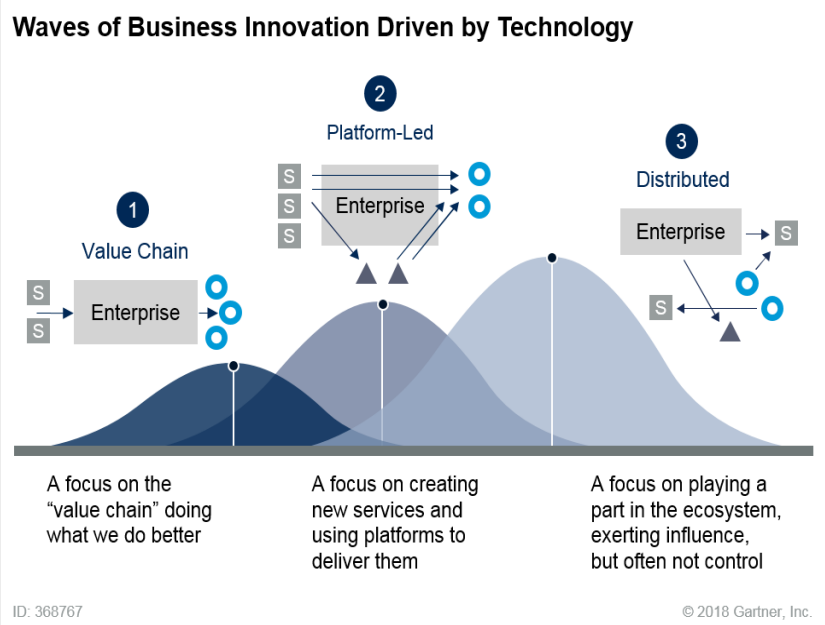
The Internet of Things, big data and other elements of digital transformation underpin the emergence and enhancement of the significance of a new business model - the ***digital ecosystem***. A digital ecosystem is a distributed, adaptive, open socio-technical system with properties of self-organization, scalability and sustainability inspired from natural ecosystems. Digital ecosystem models are inspired by the principles of natural ecosystems, especially in what concerns competition and collaboration among diverse entities (Seppänen, 2019).

An ecosystem is a new structure of economic relationships, which enables the complementaries of production and/or consumption to be contained and coordinated in the absence of vertical integration. Two types of modalities facilitate the emergence of an ecosystem: firstly, unique complementaries ("A does not function without B"), and, secondly, supermodular complementaries ("more A makes B more valuable").

The famous big American tech companies, first and foremost Microsoft, Alphabet (the holding company for Google), Facebook, Amazon, Apple, and Netflix, have succeeded in creating the largest and most important digital ecosystems. And out of the worldwide top ten digital tech companies not a single one is headquartered in Europe. Only six out of the top 50 are based in the EU and only five companies are from Japan and China (Hong Kong). In these conditions, it is unadvisable for other regions of the world, for example, for the European Union, to invest in potential funds and to subsidize domestic companies in order to try to create own regional digital ecosystems. This concerns in particular infrastructures, e.g., a proposal was made to create European cloud services to rival Microsoft's, Apple's and Google's. Even more so since these services are bound to become global commodities (Eschenbach, 2019). This does not mean constructing legal barriers to shield native businesses from American ecosystems and platform business, e.g., Uber, Airbnb, and the like. It means enabling them to compete (Graphic 2; Eschenbach, 2019; and Seppänen, 2019).

However, according to Joseph Schumpeter, economic transformation comes in two waves: the first wave includes the emergence of the infrastructure necessary to employ a new technology, while the second, a much larger wave is about the application of this new infrastructure. The focus of policymakers should now be on enabling companies to become active players in this second wave. Most importantly, it concerns many highly specialized SMEs successful in B2B niches, so called "hidden champions" (Eschenbach, 2019).

Graphic 2. Waves of business innovation driven by technology



Source: (Seppänen, 2019).

One of the important conditions for embedding companies and actors in already existing ecosystems, i.e. for their compatibility, is the development of appropriate APIs. An ***application programming interface (API)*** is an interface or communication protocol between different parts of a computer program intended to simplify the implementation and maintenance of software. An API may be for a web-based system, operating system, database system, or software library.

In order to avoid potential technical barriers to trade in the field of APIs, policymakers are advised to harmonize data management procedures and conventions; agree on common data sharing templates to support development, e.g., the "Model terms for data use" developed by the Finnish technology industries association in October 2019; develop data strategies to support boundary-crossing businesses. Further research on what types of data resources companies can treat as proprietary or as shared would be necessary. For example, approximately 49% of the Finnish industrial companies already share data with other companies (Seppänen, 2019).

Platform economies

As stated above, a central component of all definitions of the digital trade is the digital (intermediary) platform. The ***platform economy*** is economic and social activity facilitated by digital platforms. Such platforms are typically online matchmakers or technology frameworks. By far the most common type are "transaction platforms", also known as "digital matchmakers". Examples of transaction platforms include Amazon, Airbnb, Uber, and Baidu. A second type is the "innovation platform", which provides a common technology framework, upon which others can build (by using APIs), such as the many independent developers who work on Microsoft's platform.

The digital platform economy forces policymakers to adopt new and more complex approaches to regulate foreign trade. This is due to the fact that digital platforms along with their use of big data create a significant market power for themselves, which can potentially compromise the competitive environment and even the national economic security for the following reasons:

First of all, due to so-called network effects, market power is concentrated in some digital platform companies, which makes lively competition difficult. Network effects are present when the value of being with a service or network depends on the number of users of this service. The more users there are, the more useful the network becomes for each user individually and as a whole. Such network effects can be increased by the power of big data.

Secondly, in addition to network effects, high switching costs favor a lack of interoperability, which can also lead to a lock-in situation for users and promote market concentration.

Thirdly, there is another dimension: a rapid increase in the concentration of the market power in so-called "the-winner-takes-it-all" markets leads to large economies of scale and some companies in these markets are able to generate extra profits. For example, Google (with YouTube, image search and maps) has a market share of 90.8%. The remaining 9.2% are shared by other platforms, such as Yahoo, Amazon, and Bing (Visual Capitalist, 2018).

Fourthly, the digital economy has another special feature. While in regular markets an increased market power tends to lead to a decline in innovation, powerful digital companies tend to be drives for innovation. In a global comparison, they are among the companies that spend the most on research and development (R&D). The research budget of Amazon and Google in 2017 alone was USD 16.1 bln and USD 13.9 bln respectively, which combined is only slightly lower than Germany's total R&D expenditure in the same year, equal to appr. USD 19.3 bln (Wambach, 2019).

Furthermore, there is also a general rule that market power *per se* is not prohibited, it is only if exploited for unfair practices. In order to react appropriately to the new effects of the "platformization" of the international trade, policymakers are advised to apply regulations that do not punish the

innovation potential and added value of globalized digitalization. Such regulations could be based on the following principles:

First, an important element that is relevant to both competition and data protection is transparency about the use of the data, which would help reduce information asymmetries and enable client users to react better to certain offers on the platforms. In this way, clients can better react to how, by whom, and for which purposes their data is being collected by digital companies.

A transparency requirement for algorithms is advisable so that users can reliably assess whether the network is trying to influence them and that they can make their own decisions about which filters and personalizations they want to accept in the digital world – and which they don't.

Second, another way to increase competition between digital platforms is to reduce switching costs. A switch between platforms may be impaired due to too high price or due to data protection problems. Interoperability should therefore be a requirement of the legislator towards platform companies.

Third, data portability, which treats the client data as a property, is another related measure. The European General Data Protection Regulation, which entered into force in May 2018, contains the right to data portability, i.e. users of a platform are entitled to request that their data be made available to them. The expectation is that the possibility to transfer data from one platform to a competing one will also add to the competitive pressure.

Digital platforms are likely to change the global trade patterns also through "parcelization", more often referred to as ***"de minimis trade"***. The growth of online platforms has led to a rising number of small packages being sold across international borders. In 2015, e-commerce transactions were estimated at USD 260 bln worldwide, which were largely dominated by cross-border orders from domestic households (76%). This gives rise to a number of issues for policymakers, ranging from the physical management of the parcel trade to the implications for risk management (such as those related to counterfeit goods or biosecurity standards), and revenue implications related to collection of taxes and tariffs (Chazerand, 2019).

Parcels trade offers an important opportunity for firms, including those who otherwise do not have a sufficient domestic customer base. In the U.S., for instance, 97% of small businesses rely on eBay-enabled export, compared to just 4% of offline peers (Meltzer, 2018). Governments can support these SMEs by removing procedural burdens and by streamlining administrative procedures for handling parcels at the border.

On the other hand, parcelization can lead to under-recording of trade. Households and firms increasingly use platforms for direct imports and these may not be picked up in the official statistics as imports, especially if a platform operates a local domain site. The sheer number of traded parcels poses new challenges for the customs authorities and other agencies in charge of controlling goods at the border. With more individual shipments to be cleared and inspected at customs, workloads are growing, stretching the capacity of border authorities to catch illicit goods or properly identify fraud concerning the goods' value. Risk assessment strategies may also be more difficult to implement. A better targeting of shipments needs to allow the border agencies to catch offending items while preserving the flow of the legitimate trade. Such targeting could include differentiating between low and high value consignments, identifying trusted traders, and harnessing cross-country co-operation to assess risks, including that relying on a better use of digital technologies. Advanced electronic cargo information and automated risk assessment already support the border control efficiency today, while big data and pattern recognition may offer additional non-intrusive paths (Moise, 2019).

In the digital, and especially in the platform model of the economy, the volume of demand, i.e. the size of consumer/user markets, is becoming increasingly more important for the process of creating added value and making profits. This feature, however, puts traditional taxation policy in front of a new challenge. It is particularly easy for cross-border active digital corporations, e.g., Microsoft,

Google, Facebook, Amazon, Apple, and Netflix, to shift their profits, which they make from large markets with many users to where taxes are low, because they can serve a market without a physical presence, thus locating their headquarters in so-called tax havens, e.g., Ireland within the EU common market.

For this reason, the European Commission is still considering the introduction of a 3% ***digital tax*** on sales generated through online advertising, on the sale of user data, and on the provision of online marketplaces. It is estimated that such a tax can bring EUR 3 to 4 bln of new tax revenues (ifo, 2018). The G20 states have also agreed to strive for a worldwide minimum corporate tax and to re-regulate where profits of multinational companies are taxed. In the future, the location of the company headquarters should be less decisive. Instead, a "market land principle" could be introduced, which taxes profits according to where the consumers or users of services of these companies are located.

At the same time, the digital tax and "market land taxation" principles received some significant criticism. Firstly, the introduction of a digital tax is likely to lead to retaliatory measures in the form of penalty tariffs. Secondly, all export-oriented economies are likely to suffer if the market land taxation principle is implemented globally. Thirdly, as stated above, large digital economy players generally spend more on research than other companies. Tax breaks may therefore be a more justifiable measure to support corporate R&D than new tax burdens (Fuest, 2018). Instead of a new digital tax, double taxation agreements between countries could be better coordinated to tackle tax avoidance practices.

A potentially effective way to tax *de minimis* trade could be an approach, in which the national tax authority obliges a foreign e-commerce platform to independently add VAT on all goods sold into the country, provided that the platform, in aggregate, imports a volume of goods and services above a certain value threshold (Chazerand, 2019).

Digitalization and regional trade agreements

As discussed above, digitalization has a significant impact on trade. Hence, it should influence regional trade agreements (RTAs) and economic integration policies. Indeed, OECD research, for example, indicates that digitalization increases the benefits that can be drawn from RTAs. When combined with an RTA, a 10% increase in digital connectivity increases exports by additional 2.3% (OECD, 2019 b).

AI has the potential to be used to improve outcomes from international trade negotiations. For instance, it could be used to analyze economic trajectories of each negotiating partner under different assumptions, including outcomes contingent on trade negotiation, to assess how these outcomes may be realized in complex multi-country scenarios, as well as to anticipate the trade response of countries not participating in the negotiation. Interestingly, in 2018, Brazil established an "Intelligent Tech & Trade Initiative" (ITTI) that intends to use AI to improve trade negotiations (ITTI, 2018).

New disruptive technologies, including the Internet of Things, smart contracts, cryptocurrencies, and the platform economy, are elements of the digital transformation of the international trade which create new challenges for the regional trade agreements and organizations. Firstly, the digitalization of trade erases borders between countries and regional associations in the traditional and immediate sense. Secondly, it further raises the importance of good regulation of trade in services and non-tangible products. Trade negotiators, customs officials, and tax authorities, which are used to borders and tangibles, need to adapt to the transformative changes by increased digital trade without clear borders.

Digitalization, therefore, further enhances the importance of eliminating non-tariff barriers, improves domestic regulation within a national economy or regional trade bloc, betters the business climate and the governance institutions.

Of major importance becomes the elimination of non-tariff barriers and the creation of a single market within a given regional integration bloc. Apart from the traditional trade and tariff policy, more emphasis needs to be put on harmonizing and digitizing of the following areas:

- Trade in services, incl. intellectual property rights, regulations on interconnections among telecommunication and internet network operators, regulation of cross-border data flows, of data localization requirements, of e-commerce requirements;
- Technical regulations, incl. mutual recognition of e-signatures and encryption methods;
- Cross-border competition policy and anti-trust law, incl. commercial or local presence requirements, regulation on the use of locally produced software, and the creation of effective dispute settlement mechanisms for e-commerce;
- Labor mobility, incl. e-visas and favorable treatment for skilled IT-specialists;
- Taxation, incl. setting a standard *de minimis* threshold, online tax registration and declaration for non-resident firms;
- Financial market, incl. enabling access to digital payment methods, harmonization of security standards for payment transactions;
- E-government, incl. digitization and mutual access of public procurement, intergovernmental acceptance of e-documents;
- Customs control, incl. digital single window systems;
- SME support, incl. the creation of pan-regional open business e-registries and e-maps;
- Industrial policy, incl. the creation of shared databases for companies of various types of big data, e.g., “digital copies” of industrial goods, subcontracting orders, client information.

In a regional integration bloc, all these areas can be covered within the framework of an overarching digitalization strategy, such as, for example, the EU Digital Single Market Strategy. Completing the digital single market is estimated to have brought additional EUR 415 bln per year to the European economy by 2020 (De Koster, 2019). And the Eurasian Economic Union (EAEU) Digital Agenda is estimated to increase the EAEU’s GDP by 10.6% until 2025 (Barseghyan, 2019).

Liberal economists argue that it is important that policies facilitating a common digital market within a given regional trade agreement do not create artificial barriers for the entry and provision of services of the world’s leading digital companies, i.e., Microsoft’s cloud service, and, on the other hand, do not create unnecessary greenhouse conditions, which, as a result, can make own digital business uncompetitive in the larger world market (Chander, 2019).The nature of the digital economy is such that the overall welfare effects can only be obtained by integration into global digital networks and platforms, and that leaders can emerge only in competition in a large enough market. This feature is another argument in favor of maintaining a global multilateral trade architecture, especially under the World Trade Organization, but it can also be used to support region-to-region integration processes, including, for example, a potential EU-USA or EU-EAEU free trade agreement.

For example, in order to mitigate a risk to become dependent on Libra, a US-dominated cryptocurrency, the EU might wish to create its own digital currency. Issuing a digitized euro by the European Central Bank would be a solution. Digitization could make the euro fail-safe as “full money”, take a large part of the debts of the euro states out of the market in a one-time transaction, reduce the costs of payment transactions, and make the European common currency competitive with the upcoming cryptocurrencies (Mayer, 2019). An important element in such an initiative would be to pursue such a foreign trade policy which would aim to establish the euro as the largest reserve currency in non-EU countries. This could become part of future free trade negotiations of Brussels with third countries.

Already more than half of the trade agreements concluded since 2005 address digital trade in some shape or form. Below are some examples (Hotak, 2019).

Among recent FTAs, the ***Trans-Pacific Partnership (TPP)*** had the most comprehensive coverage in terms of elements related to digital trade. It included acceptance of electronic copies; e-submission of trade-related documents, such as SPS certification; electronic customs systems; e-certification and e-signature, including mutual recognition; and international standards.

The ***Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)***, which evolved from the never realized TPP, provides for personal information protection, sets measures against unsolicited commercial electronic communications, pursues a common cybersecurity policy, and ensures cross-border transfer of information.

The ***United States – Mexico – Canada Agreement (USMECA)*** prohibits data localization policies, especially those applied to financial services. It regulates and supports a cross-border transfer of information by electronic means, sets the liability of intermediary service providers, upholds the non-disclosure of software source code and related algorithms, and promotes open government data.

The three ***EU Association Agreements (AA) with Georgia, Moldova and Ukraine*** set out a framework of approximation towards EU regulations concerning audiovisual policy and electronic communications, e.g., strengthening the independence of the national regulator; rules on authorization; access and interconnection of electronic communication networks; universal service obligations (USOs); e-signatures; mutual recognition of the conformity of radio and telecommunications equipment; harmonized conditions for spectrum use of mobile communications on aircraft; and the re-use of public sector information. This implies that legislation in the three countries will be gradually made compatible with existing and future EU legislation. However, areas, such as data protection, cyber security and defense, and copyright-related issues are not featured in these AAs (Akhvlediani, 2019).

The ***Sri Lanka – Singapore Free Trade Agreement (SLSFTA)*** enshrines non-discrimination against digital products, regulates electronic authentication and electronic signatures, and the principles of paperless trading. It sets the framework for domestic electronic transactions and ensures online consumer protection.

According to the European business association DIGITAL EUROPE, there are two important points to be remembered when conducting negotiations on digital trade, which have to do with non-economic dimensions, such as human rights and culture. Namely, the personal data privacy should be considered a fundamental human right and should therefore be non-negotiable. Also, it is necessary to preserve the opportunity to have exemptions in the field of trade in (digital) services in that part of entertainment, where they affect the characteristics of the national culture. For example, a ban on displaying a certain content can be regarded by one side as an unjustified barrier, while another side considers this limitation justified in connection with the need to "protect national traditions and morality". In such a dispute both parties may be right, each in their own way, and therefore it is important to resolve such issues before they arise (Chazerand, 2019).

More details about the impact of digital transformation on regional and interregional economic integration can be found in the IIASA background paper "Connectivity in the Digital Age. Digital Futures of Trade and Economic Cooperation in Eurasia" (Erokhin, 2019).

Free trade vs. protectionism in the digital age

Expert opinions accumulated in this report indicate that not only the principles of free trade apply in the digital age, but the success in the digital economy directly depends on the elimination of non-tariff barriers to trade. The Ricardian concept of comparative advantage holds true for the digital trade: countries should specialize in those aspects of the (digital) economy that they are best in. Currently, for example, the US is strong in platforms and the EU is strong in APIs. Digital services are really globalized and hence consumer welfare will be increased if better and cheaper digital services are imported from abroad, when available. For these reasons, cyber protectionism, such as pushing out foreign digital service providers in the hope of cultivating domestic alternatives, e.g., through data localization requirements, is generally considered harmful and ineffective (Chander, 2019).

It is in this light that in 2019 Japan began advocating the agenda of ***"Data Free Flow with Trust" (DFFT)*** on facilitating open data flows and a rules-based digital trade. Among other things, this initiative includes a ban on forced localization and on forced disclosure of source code source, as well as a permanent moratorium on e-transmissions tariffs. The agenda encourages the World Trade Organization to take up the task of setting new rules for the global digital economy under the ongoing WTO e-commerce negotiations (Chazerand, 2019).

At the same time, there may be reasons for exceptions. Firstly, there is the economic infancy-of-industry argument. The "new" growth theory (Aghion and Howitt, 1997) differentiates between countries on the global technology frontier and countries behind it. While the former can only grow through innovation, i.e., by pushing the global technology frontier further, the latter can grow through imitation, i.e., by copying and adapting existing technologies. As a result, they can learn and eventually catch up. However, there is no one-size-fits-all industrial policy fitting both types of countries. For countries on the technology frontier, competition, openness, protection of intellectual property, effective university and research system are conducive to keep up with further developments on the technology frontier. On the contrary, restrictions on competition that protect domestic companies, imports of human capital and the copying of technologies – even if intellectual property rights are disregarded – *might* help countries behind the technology border to develop and catch up the global leaders (Falck, 2019).

Secondly, a non-economic argument can be made in favor of protecting the national economic security. Accordingly, certain regulations, e.g., the data localization requirements, may have a right to exist if they are not aimed at creating protectionist barriers but at safeguarding national security interests or against potential industrial espionage, as outlined in Articles III and XXI of the General Agreement on Tariffs and Trade (GATT), as well as in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Here, the question arises on how to judge what is more important – the intention or the ultimate effect.

Often countries catching up the technology frontier, such as China, are blamed for using unfair trade practices (Kuhn, 2018). However, even digital leaders could abuse their monopoly power in the market, especially within the framework of the platform economy. For example, German business circles have expressed concerns that the 2018 CLOUD Act allows the US authorities to receive any industrial data of European companies stored on the cloud services of the predominantly American companies, such as Microsoft, IBM, Amazon, including digital twins, latest inventions, personal customer data, etc. (Fier, 2019).

Thirdly, as has already been mentioned, safeguards may be appropriate for the protection and inviolability of the private sphere. The most famous example of such a measure is the General Data Protection Regulation (GDPR) implemented in the European Union since May 2018, which requires

companies to protect the personal data and privacy of the residents of EU countries. A year later Google was fined a record USD 56.2 mln for failing to comply with the GDPR.

If such requirements are implemented only unilaterally, they may be burdensome not only for foreign competitors but even more so for domestic firms. For example, around a third of German companies complain over competitive disadvantages due to the GDPR in relation to their international counterparts outside the EU that do not have to comply with the GDPR. Industrial service providers are struggling in particular: 37% of them feel that they are disadvantaged (Engels et al., 2020). In this regard, it seems appropriate that the requirements for the protection of private data should become a part of the agenda of multilateral trade negotiations. Competitive advantages can only be minimized if a large enough part of the global market is willing to internalize the costs of privacy protection.

In all three of the above exception types, it is important to distinguish between a justified rationale of their application and unjustified and likely ineffective protectionism (Chander, 2019). Of course, the watershed is quite subjective and depends on the economic viewpoint.

A different aspect, which should be considered in this debate, is the objectivity of international comparisons and rankings on digital openness. For example, in some cases the Russian regulation is less restrictive than that of the majority of countries in such areas as e-commerce licensing and registration of national domain names. Thus, more work should be done in order to improve methodologies, best practices and information about current regulation to enhance the digital trade policy assessment tools (Flegontova, 2019).

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Futures of international economic cooperation in Eurasia in the times of digital transformations

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