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Digital Trade

DEVELOPING A FRAMEWORK FOR ANALYSIS

Javier López González, Marie-Agnes Jouanjean

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DIGITAL TRADE: DEVELOPING A FRAMEWORK FOR ANALYSIS

Javier López-González and Marie-Agnès Jouanjean, OECD

This paper explores the definition, measurement, and policy implications of digital trade, proposing a tentative typology of digital trade that can be used to unpack transactions and analyse the issues. Digitalisation is changing what and how we trade: from digital delivery to greater physical trade enabled by digital connectivity. Online platforms mean more small packages crossing borders, while new technologies are changing how services are produced and delivered. Underpinning digital trade is the movement of data: data is a means of production, an asset that can itself be traded, and the means through which some services are traded and GVCs are organised. While there is no single definition of digital trade, there is a growing consensus that it encompasses digitally enabled transactions in trade in goods and services which can be either digitally or physically delivered involving consumers, firms and governments. Unpacking trade transactions along these lines using a tentative typology can help in understanding and identifying issues. For example, measuring digital trade poses challenges ranging from identifying transactions that are digitally enabled to the sectoral classification of services in a transaction, and efforts are underway to better reflect digital trade in trade statistics. For trade policy, the increased bundling of goods and services raises issues about which trade rules (GATT or GATS) apply; trade facilitation is ever more critical for just-in-time delivery and GVCs; and the role of data flows in enabling digital trade may require further attention, along with how to ensure that the gains from digital trade are inclusive, within and across countries.

***JEL codes*:** F02, F13, F19, F42, F55, F68, L14, L22, L81, L86, O14

***Key words*:** Digitalisation, digital transformation, international trade, e-commerce, data, platforms

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EXECUTIVE SUMMARY

The digital transformation is fundamentally changing the international trade landscape. In this fast evolving environment, governments are facing growing regulatory challenges, not just in managing issues arising from digital disruption, but also in ensuring that the opportunities and benefits from digital trade can be realised and shared inclusively. Trade practitioners are increasingly trying to understand how the digital transformation is shaping international trade.

The age of digitally enabled trade is not just about digitally delivered trade, it is also about more physical, traditional or GVC, trade enabled by growing digital connectivity increasing access to foreign markets for firms in a way that would previously have been unimaginable.

Digitalisation and new technologies change how we trade but not why we trade. Trade is still subject to comparative advantage, and informational asymmetries and barriers to trade both at-the-border and behind-the-border. However, new business models are changing how we trade:

- The growth of online platforms has led to a rising number of small packages crossing international borders.
- New technologies are also changing how services are produced and supplied, blurring already grey distinctions between modes of delivery and posing new challenges for the way international trade and investment policy is made.
- Emerging technologies, such as distributed ledgers (Blockchain) or additive manufacturing (3D printing) have the potential to further change how we trade in the future.

Digitalisation is also changing what we trade:

- New 'information industries' supplying, for example, 'big data' analytics, cybersecurity solutions or at-a-distance quantum computing services across borders are emerging.
- At the same time, digitalisation is also changing the tradability of already established service industries and enabling a greater bundling of goods and services.

The movement of data, or information, across borders underpins this digital trade environment.

- It is at the core of new and rapidly growing service supply models such as cloud computing, the IoT and additive manufacturing.
- It also underpins trade less directly: by enabling control and coordination along international production networks or by enabling the implementation of trade facilitation measures.
- Data flows are thus a means of production, an asset that can themselves be traded, the means through which some services are traded, and the means through which GVCs are organised.

While there is no single recognised and accepted definition of digital trade, there is a growing consensus that it encompasses digitally enabled transactions in trade in goods and services which can be either digitally or physically delivered and which involve consumers, firms and governments. A tentative typology of digital trade, along these dimensions, is proposed to better unpack trade policy and measurement issues.

From the point of view of measurement:

- Separating digitally enabled from non-digitally enabled transactions can be complex. Classification issues can also complicate identifying which sectors are involved in transactions.
- Flows which do not result in a monetary transaction but which might support one also pose challenges.
- Efforts are underway to better reflect digital trade in international trade statistics to assist policy-makers.

There are also a number of trade-related issues that may require further thought:

- The bundling of goods and services and the rise of new technology-driven products and markets might call for clarifications on which rules might apply to different products, whether GATT or GATS, and perhaps a re-think on how to best to approach certain negotiations.
- Growing interconnectedness and a greater demand for just-in-time delivery also means that trade needs, more than ever, to be faster and more reliable underscoring the need for more efficient trade facilitation.
- The role of data flows in enabling the digital trading environment will also require further attention. Policy design should seek to nurture digital trade by enabling the movement of data across borders while ensuring appropriate scope for countries to regulate to achieve legitimate public policy objectives.

Finally, and in view of making the gains from the digital transformation more inclusive, further attention to the development aspects, or to how countries at different stages of development engage in digital trade transactions, is needed.

1. Introduction

The digital transformation is fundamentally changing the way people, businesses and governments interact. The 21st century has ushered in the information era of bundled goods, services and ideas, delivered across borders by businesses and consumers through physical devices connected to digital platforms. Digital infrastructures such as the Internet were originally conceived to be global, and while they offer new opportunities for scale, particularly for small- and medium-sized enterprises (SMEs), businesses in developing economies, and preference matching for consumers, they also raise key challenges for domestic and international trade policy in a world where borders between countries remain.

In much the same way that reductions in transport and coordination costs enabled the fragmentation of production along global value chains (GVCs), falling costs of sharing information, relaxing some of the constraints associated with engaging in international trade, are both enabling more traditional or GVC trade powering a digital trade revolution that is changing what and how we trade (although not why we trade). However, there is no final agreement on what digital trade is or what types of activities fall within its scope.[1] The term is often used to refer to different elements of the changing trade environment, such as the cross-border sale of goods through online retail websites and platforms or the delivery of digital services across borders. There is value in laying out some key concepts for the analysis of digital trade, promoting a greater shared understanding among researchers and contributing to better policy design in the face of emerging trade challenges.

While there is no single recognised and accepted definition of digital trade, there is a growing consensus that it encompasses digitally enabled transactions in trade in goods and services which can be either digitally or physically delivered and which involve consumers, firms and governments. At its most basic, digital trade is underpinned by the transfer of bits and bytes across borders. Data flows connect businesses (e.g. through service links), machines (e.g. the Internet of Things, or IoT) and individuals (i.e. peer-2-peer or social networking) to each other. Increasingly, data itself is generating significant income streams, facilitating the delivery of new, and previously non-tradable, goods and services and, for the latter, blurring the lines between the modes in which these are delivered.

In this fast evolving environment, governments are facing growing regulatory challenges, not just in managing issues arising from digital disruption, but also in ensuring that the opportunities and benefits from digital trade can be realised and shared inclusively. Trade practitioners are increasingly trying to understand how the digital transformation is shaping international trade and whether the changes need to be better reflected in the 'rules of the road'. Existing multilateral trade rules were negotiated when digital trade was in its infancy, and, even if originally conceived to be technologically neutral, questions have arisen over whether they might require modernising to reflect new forms of, and issues from, digital trade.

This paper sets out to identify, and to some extent unpack, some of the key changes that digitalisation brings to the way international trade takes place. The paper discusses how the digital transformation changes what and how we trade, and the role that data flows play as enablers of new trading relations and in the delivery of new services (Section 2). It then puts forward a simple, and flexible, typology for analysing digital trade as a tool to contribute to a better understanding of the trade policy issues that arise in this new trading environment (Section 3). The paper unpacks several digital trade transactions to highlight different

1. Although there is no recognised definition of digital trade, the OECD (2011) and the WTO (1998) working definitions for e-commerce form the basis for the analysis provided in this paper. The term is often used to refer to different elements of the changing trade environment such as the cross-border sale of goods through online retail websites and platforms (e-commerce) or the delivery of digital services across borders.

characteristics and trade policy challenges that these transactions raise (Section 4) and discusses some preliminary implications for measurement and trade policy (Section 5).

The ultimate aim of the work is to help better understand the policy challenges of 21st century trade so that regulatory approaches can be pro-active, and ensure that the benefits of digital trade are being fully reaped and that open markets for digital trade can be combined effectively with safeguards to key public interests.

2. A new era of globalisation

International trade has gone through three stages (Table 1). The first, often referred to as the 'first unbundling' (Baldwin, 2012), or 'traditional trade', was spurred by falling transport costs which enabled the separation of production and consumption across national borders. Consumers gained from wider access to new and more competitively priced products from abroad and trade mainly involved final goods. In this context, trade policy was largely concerned with market access to ensure that the benefits from trade in final products could be reaped.

The second unbundling, or 'GVC trade', arose from continued reductions in transport and coordination costs enabling businesses to fragment processes of production across national borders and to exploit locational comparative advantages. Trade in intermediate products or tasks flourished and global production relocated, in part, towards emerging economies (Baldwin, 2016). Trade policy became more complex, increasingly involving trade facilitation and behind-the-border issues aimed at reducing bottlenecks along the value chain.

Table 1. Characteristics, drivers and trade policy issues across the different waves of globalisation

Type	Characteristics	Driver	Trade policy issues
"Traditional" trade	- Separation of production and consumption across international borders - Trade in final goods	- Reductions in transportation costs	- Market Access
GVC trade	- Unpacking of factories across international borders - Trade in intermediate goods and services - Changing role of services as tasks are outsourced	- Reductions in transport and coordination costs	- Trade-investment-service-knowledge nexus - Trade facilitation, domestic, behind-the-border NTMs
Digitally enabled trade	- Unpacking of production, logistics and consumption, more traditional and GVC trade: age of hyperconnectivity - Trade in smaller quantities of physical goods and digital services - Changing tradable nature of services. - Bundling of goods and services	- Reductions in transport, coordination and mainly costs of sharing information - Digitalisation	- Data flows - Digital connectivity - Interoperability

Source: Authors' elaboration.

The third unbundling, or the age of digitally enabled trade, is driven by further reductions in transport and coordination costs, coupled with a considerable fall in the costs of sharing ideas through the transfer of data, or information. This new era of hyperconnectivity is not just about digitally delivered trade, it is also about more physical, traditional or GVC, trade enabled by growing digital connectivity increasing access to foreign markets for firms in a way that would previously have been unimaginable.

Digitalisation has not only changed how we trade but also what we trade: a larger number of smaller and low-value packages of physical goods, as well as digital services are now crossing borders; goods are

increasingly bundled with services; and new, and previously non-tradable, services are now being traded across borders. In this context, negotiating market access and behind-the-border measures continue to be trade policy priorities; digital trade still involves goods and services crossing borders and the applications of differing national regulations. But additional trade policy considerations are also emerging, related to data flow regulation, digital connectivity and interoperability.

2.1. … Changing how, but not why, we trade

Digitalisation and new technologies change how we trade but not why we trade. That is, trade is still subject to comparative advantage, and informational asymmetries and barriers to trade both at-the-border and behind-the-border continue to apply.[2] However, new technologies, reducing the cost of sharing ideas across borders and connecting different actors along the value chain, are helping overcome many of the constraints associated with engaging in international markets, shifting sources of comparative advantage and leading to the adoption of new business models. Indeed, the organisation of trade along GVCs was itself in part spurred by the adoption of digital technologies which led to a decrease in coordination costs and "heightened the international mobility of managerial and manufacturing know-how" (Baldwin and Lopez-Gonzalez, 2013:5).

Digital platforms are increasingly supplanting traditional physical intermediaries to connect supply and demand.[3] Online marketplaces such as Amazon, eBay or Alibaba, are helping SMEs and consumers engage more directly in international trade. Such platforms help reduce informational asymmetries and search frictions and address the constraints posed by thin markets, helping firms, and particularly SMEs, more easily upscale production and bear the costs associated with exporting – an especially important factor for firms in developing countries. In parallel, consumers are better able to find matches to their preferences and are now more directly involved in importing and exporting products.[4]

The growth of online platforms has seen a rising number of small packages now crossing international borders. Small value products are particularly sensitive to trade costs, from shipping costs to at-the-border and to-the-border logistics and formalities costs, which represent a larger share of the value of the shipped product. The trade policy issues these packages face depend largely on the trade facilitation environment; on the efficiency of transport and logistics services; and the de minimis provisions in the receiving country, which set a threshold for the minimum value below which no tariffs or taxes are collected. Too low a threshold can unnecessarily raise the cost borne by importers and exporters; increase delivery times; and overburden customs authorities having to clear more packages, with implications for risk-based management systems. However, too high a threshold might result in lost tariff revenue.[5]

New technologies also change how services are produced and delivered. Digitalisation fosters innovative cross-border collaboration processes for the production of services and provides a new means for their delivery through digital platforms and physical devices. As a result more trade in services, including in small-value digital services such as streamed music, e-books and online games, is also taking place. The digital transformation is further blurring already grey distinctions between conventional cross-border trade in services (GATS Mode 1), consumption abroad (Mode 2) and services provided through foreign presence

2. Many of these economic constraints have been well established for many years: i.e. informational asymmetries (Akerlof, 1970) or hold-ups in trade (Grossman and Hart, 1986).

3. Intermediaries arose to solve issues related to search frictions (Bernard et al. 2011); digital platforms provide a more efficient way of reducing these.

4. With potential risks for firms and consumers where liability, consumer protection or adherence to rules in the exporting country are concerned.

5. An optimal *de minimis* level is hard to define, but differences in provisions can be burdensome for SMEs selling across multiple markets.

(Mode 3), and is posing new challenges for the way international trade and investment policy-making is made and how international trade, especially in services, is measured.

Emerging technologies, such as distributed ledgers, or Blockchain, have the potential to further change how we trade in the future. By making international contracts more transparent and enforceable, and facilitating the transfer of value, the Blockchain has the potential of reducing 'hold-ups' in trade and facilitating just-in-time delivery along GVCs. In parallel, additive manufacturing, or 3D printing, can also change how goods are delivered and the structure and operation of supply chains for parts and components.

As firms adopt new technologies they are likely to move towards more knowledge-intensive processes of production, giving rise to new sources of comparative advantage. Automation has the potential to reduce the role of labour abundance or skills in determining comparative advantage in trade in goods, from agriculture to manufacturing, and trade in services. Intangible assets and access to knowledge-based capital (KBC) may become increasingly important, potentially fundamentally changing the way factors of production are allocated both within the firm and across borders through global value chains.

2.2. … And changing what we trade

New technologies and digitalisation are also giving rise to new 'information industries': delivering 'big data' analytics, cybersecurity solutions or at-a-distance quantum computing services across borders. At the same time, digitalisation is changing the tradability of already established service industries. For instance, some transport services, such as taxis, have traditionally not been tradable across borders and have required domestic presence, but digitalisation is changing the nature and delivery of such services. This is not only a potential source of disruption in the domestic economy and a challenge for regulators, as has been seen in the case of growing accommodation-sharing or ride-sharing services, it also has implications for current and future liberalisation schedules under GATS, since many commitments were negotiated before these disruptive players entered the marketplace.

The digital transformation is also enabling a greater bundling of goods and services. Bundling can occur at the product level, when physical devices are used as conduits for the delivery of bespoke services, such as in the IoT, or at the production level, where goods embody more service inputs such as design, research and development and marketing. This bundling is partly reflected in the high share of services in value added exports versus gross exports: globally, services represent 20% to 25% of gross exports but in value added terms they represent 50% of trade, revealing the high service content of goods trade.[6] Furthermore, this might only capture part of the story, since goods, such as e-readers or tablets, can subsequently enable the delivery of new or traditional services.[7]

With services increasingly being embodied in goods, as is the case for connected cars and smart home appliances, and goods increasingly being used to deliver services, such as health monitoring devices, the lines between goods and services, and manufacturing and service activities more generally, are increasingly less clear cut. This can give rise to issues regarding whether exports of goods are dependent on the ability to access the embodied service, or indeed in terms of the classification of such services in terms of trade commitments. The uptake of 3D printing may further complicate matters. When a computer-aided design (CAD)[8] file is sent across the border it is likely to be considered a digital design service, but when it reaches the consumer it is transformed into a physical good. This matters because international trade rules, be

6. See the OECD-WTO Trade in Value Added (TiVA) database.

7. Goods that are sold can subsequently enable further sales of services. For example, digital devices can facilitate the delivery of further audio-visual services which are not embodied in the digital device itself.

8. A CAD file is an intangible digital content product that a consumer can purchase and then upload to a 3D printer, with a view to producing a physical good.

it at the multilateral or at the bilateral or regional level, are negotiated with a relatively clear distinction between commitments in goods and those for services. Bundled products can complicate identifying the rules and provisions that apply to cross-border transactions.[9]

2.3. … Underpinned by the movement of data

The movement of data, or information, across borders underpins this digital trade environment. It is at the core of new and rapidly growing service supply models such as cloud computing, the IoT and additive manufacturing. It also underpins trade less directly: by enabling control and coordination along international production networks or by enabling the implementation of trade facilitation measures. Data help organise flows of goods and services; facilitates working with contractors and suppliers; makes electronic payments (such as online banking or mobile payments) feasible and is central to in-plant production which increasingly involves employees working alongside robots (so called, 'cobot'). Data flows are thus a means of production, an asset that can themselves be traded, the means through which some services are traded, and the means through which GVCs are organised and some trade facilitation measures implemented.

Data flows provide a means of sharing information thereby reducing market failures which are well established in theoretical and empirical economic literature (Box 1) – helping match supply and demand; solving issues arising from asymmetric information; and reducing hold-ups in trade transactions. This has led to reductions in the cost of engaging in export and import markets and facilitated the coordination of internationally fragmented modes of production. But while data flows support the new digital trade environment, whether through logistics or in the delivery of goods and especially services, not all cross-border data flows represent trade transactions (there may, for example, be no monetary transaction involved in an intra-corporate movement of data). Nevertheless, given the important enabling role they play, data flow restrictions can have trade consequences (highlighted in greater detail later).

More concretely, digital technologies and enhanced connectivity through data flows increase the efficiency of moving goods across borders. Digitisation of customs information and management – through paperless trading, on-line registration of information, e-certification and on-line payment of customs duties – reduce trade costs and speed-up clearance at the border. Digital innovations in product tracking and traceability (including for agricultural products), and the logistic chain, facilitating information sharing, can also increase trust and efficiency as well as flexibility, particularly important in just-in-time delivery systems.

Information can also be internationally traded and directly monetised as is demonstrated by the rise of information industries, and it can also be paid for through the 'sale' of other information. As recognised in the revised *OECD Recommendation on Consumer Protection in E-commerce*, online services, such as apps, social networking, or e-mail client, are increasingly delivered to the consumer without monetary payment. Firms monetise the delivery of services within these platforms by using consumers' personal information, or meta-data, to better target advertising. Other platforms such as marketplaces or aggregator sites deliver information to help consumers make informed choices and monetise through taking a share of a successful transaction.

9. Fleuter (2016) provides a discussion of 3D printing and digital products more generally and how these would be treated under the WTO. He suggests that digital products "should be treated as services and therefore governed by the GATS". However, others have argued against this approach, noting that obligations under the GATS adhere to service suppliers, but in the case of digital products it is not clear who this would be (e.g., for a digital book, is the supplier the author, the publisher or the distributor?). WTO Members have not yet agreed on the treatment of digital products as goods or services and this remains a matter of debate. An alternative approach, explored in some free trade agreements (FTAs), is to apply MFN and national treatment to digital products independently of how they are classified.

Box 1. Information and economic theory

Economic models often assume perfect information or foresight which implies easily attainable market clearing conditions with few, but well defined, market failures. But as early as Coase's (1937) seminal contribution to the theory of the firm, information has played an important albeit elusive role in economic thought. Coase asked a simple question: why do firms exist? If the price mechanism worked perfectly, then there would be few conditions under which work would be organized within firms. Workers would freely sell their labour to the highest bidders and move to different markets where returns were highest. So why are there firms at all? Coase posited that "there is a cost of using the price mechanism" meaning that firms exist because of organisational or coordination costs. Information frictions, as well as time inconsistencies or inefficiencies in contracting, lead to firms being an optimal way of allocating work.

In 2001, the Nobel prize in economics was awarded to George Akerlof, Michael Spence and Joseph Stiglitz for their contribution to the analysis of markets with asymmetric information. Akerlof (1970) noted that asymmetric information between buyers and sellers in the market for second hand cars would lead to market failures where only 'lemons' (i.e. bad quality cars) would be sold. This 'adverse selection' problem would drive sellers of good-quality second hand cars out of the market even when there was a demand and supply for high quality second hand cars.[10] Michael Spence showed how some market outcomes could improve through signaling (counteracting some of the effects of adverse selection). Stiglitz later introduced the concept of screening through self-selection.

In 2010 the Nobel prize was awarded to Peter Diamond, Dale Mortensen and Christopher Pissarides for their contribution to search and matching theory. Prior to their work, it was assumed that perfect information and costless access to marketplaces led to rational economic agents making efficient decisions within a marketplace. By contrast, Diamond, Mortensen and Pissarides argued that real-world transactions involve frictions. Buyers and sellers incur search costs which lead to inefficient market outcomes. Matching supply and demand requires facing these search costs and this leads to price dispersion for seemingly similar products.

These contributions to the theory of information are useful when thinking about digital trade. As suggested in the first page of *Information Rules* by Shapiro and Varian (1999) "durable economic principles can guide you in today's frenetic business environment. Technology changes. Economic Laws do not". In effect, digital platforms, as conduits of information, have an important effect in reducing market failures such as adverse selection or search frictions. In this sense, they move the real economy a little closer to the early academic ideas which are based on the free-flow of information. A digital platform will mean more efficient markets (as search frictions associated with international trade fall) as well as more markets (as adverse selection is reduced).

However, the ubiquitous exchange of data across borders has led to growing concerns about digital security, audit capacity and protection of individual privacy, particularly in light of different regulatory approaches and preferences for privacy protection across countries. Over the last decade, this has given rise to increased data-flow regulation which places conditions on the transfer of data across borders and, in some instances, requires firms to store data locally, whether for audit, security or privacy reasons[11]. While these measures may aim to tackle genuine public policy concerns, such as protection of privacy, they may also have economic consequences, now and in the future, for the diffusion of new technologies, coordination of global value chains and adoption or deployment of new business models.

Openness to data should help firms better face rising competitive pressures and increase the diffusion of technology. In this context, balancing the right level of protection and security for citizens while maintaining Internet openness will be important to make the most out of globalisation and mitigate some of the negative

10. The problem is the following: there are high-quality and low-quality second-hand cars: peaches and lemons respectively. If peaches are worth on average 10k and the lemons 5K but buyers cannot observe the quality of the cars then they will offer a price that is the average of the two, i.e. 7.5K. At this price, sellers are not willing to sell the high quality cars and therefore they will leave the market. As this process unfolds, more and more high-quality car sellers will leave the market and only a market for lemons will remain.

11. Similar analysis has been undertaken by ECIPE, 2016.

effects associated with rising interconnectedness.[12] Greater shared understanding on issues such as this will help countries better find balance between ensuring important public policy objectives, such as protection of privacy and digital security, and maintaining the trade benefits from free flows of data are met.

2.4. … Requiring a common framework for analysis

Digital trade is an emerging trade policy issue and, at early stages of analysis, it is hard to predict how the digital transformation will change trading relations between countries. Indeed, no one could have predicted how the Internet has shaped the way we trade today. But technological change, in the age of hyperconnectivity, is fast-paced; ideas and technologies diffuse more rapidly than ever before, changing business models and how international trade and production is organised.

In this context, it is useful to take a step back and try to think through the basis for a common approach for thinking about digital trade, one that can help better focus research efforts and which can be used to help policy makers identify forthcoming challenges. In developing this framework, and in setting out some of the key vectors of change, many more questions will be raised than will be answered. However, focusing on the right questions will provide an important first step towards identifying the policy challenges that lie ahead.

3. Towards a typology of digital trade

While there is no single, recognised and accepted definition of digital trade, there is a growing consensus that it encompasses digitally enabled transactions in trade in goods and services.[13] This characterisation, based on the OECD's (OECD, 2011) and the WTO's (WT/L/274, dated 30, September 1998) definition of an electronic commerce transaction, lends itself to decomposing the digital trading environment into a number of distinct categories of transactions (Figure 1), each of which raising different questions for trade and investment policy as well as measurement: foreign goods or services purchased via a foreign on-line intermediary; foreign goods or services purchased via a domestic on-line intermediary; domestic goods or services purchased by a foreign on-line intermediary; and domestic goods or services purchased by a foreign-owned domestic intermediary.[14]

12. This can be challenging and countries are seeking guidance on the most effective policy approaches. The OECD has developed useful principles through the OECD Privacy Framework, incorporating Guidelines governing the Protection of Privacy and Transborder Flows of Personal Data (OECD, 2013b). The Asian-Pacific Economic Cooperation (APEC) has also developed some rules aimed at helping firms meet different privacy regulations across jurisdictions (see www.cbprs.org).

13. It is important to note that there are many different concepts which refer to digital trade or electronic commerce. The OECD definition of an electronic commerce transaction, which is the starting point for the typology, is the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders. (*Guide to Measuring the Information Society* OECD, 2011). The WTO's working definition is broad: "electronic commerce is understood to mean the production, distribution, marketing, sale or delivery of goods and services by electronic means" (WT/L/274, dated 30 September 1998). The typology of digital trade in this paper aims to focus on the most salient points from the perspective of analysis and measurement. For the typology, digital trade may involve, for example, physical goods as well as products and services that can be delivered digitally; that is, delivery as well as payment may be offline or online.

14. Illustrating some of the many transaction taking place in this new environment.

Digital trade enablers provide the hard and soft infrastructure, ranging from cables and wires to data flow regulations, which support digital trade transactions.[15] Data flows enable digital trade transactions and also support trade through enabling control and coordination along international production networks or facilitating the implementation of a range of trade facilitation measures. However, while all digital trade is enabled digitally, not all digital trade is digitally delivered.

Digital trade involves both physically delivered and digitally delivered trade: digitally enabled purchases of digital services, such as remote computing services, or architectural plans delivered on-line; or digitally enabled but physically delivered goods and services, such as a purchase of a good on an on-line marketplace or the booking of a hotel through a matching service. How the transaction is delivered and what type of product is being transacted will determine the trade policy environment it faces since trade policy commitments and rules differ for goods (GATT) and services (GATS).

Thinking more broadly, it is also important to consider the actors involved in different transactions. In this sense, while traditional trade, at least before the advent of GVCs, mainly involved business-to-consumer (B2C) transactions and GVC trade introduced growing business-to-business (B2B) interactions, digital trade has helped accelerate GVC trade and opened up new avenues for businesses, consumers (households) and governments (through, for example, eProcurement) to interact.

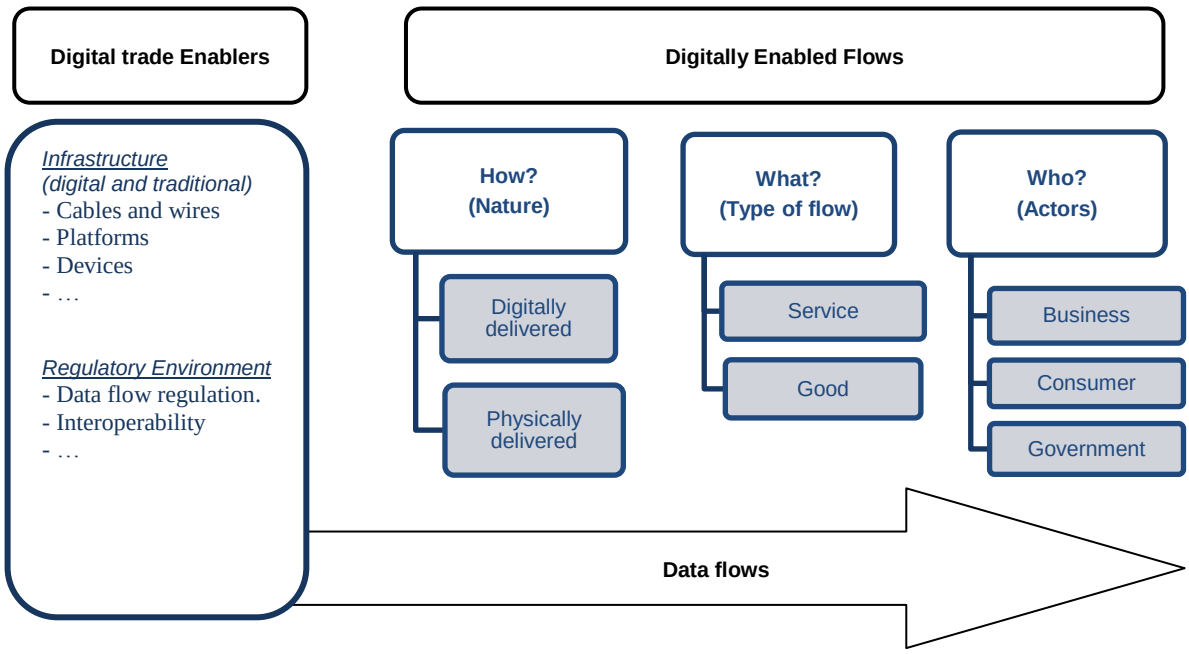
These distinctions facilitate a deeper analysis of transactions and motivate a tentative typology of digital trade (Figure 1) predicated on the starting point that digital trade is underpinned by data flows that enable trade in goods and services.[16] The tentative typology brings together the How (whether physically or digitally delivered); What (the object of the flow or transaction) and Who (the actors) of digital trade.[17] It is intentionally flexible and modular, allowing for updates to be made along the different dimensions, with the aim of reducing the risk of becoming obsolete as new technologies emerge.

15. There are many different types of digital enablers, these are discussed at greater length in OECD (2017b); the focus here is on those which most directly support or impede international trade.

16. In this respect it is important to note that although the underlying data flows may not be necessarily recognised or recorded as trade flows, in existing international standards of trade statistics (since they are often not associated with a monetary transaction), their disruption or restriction can prevent digital trade from happening or determine how that trade takes place.

17. The typology does not aim to define digital trade for the purposes of negotiations; rather, it aims to assist in both the development of a measurement framework for digital trade and to provide an analytical tool to assist in unpacking and understanding digital trade transactions.

Figure 1. A tentative typology for digital trade



Note: The modular nature of the typology enables further updating. For example, OECD (2017a) further identifies digitally ordered and platform enabled as 'How' categories.
Source: Authors' elaboration.

4. Unpacking digital trade – some stylised examples

The typology can be used to disentangle the series of transactions underpinning digital trade to help understand when or where trade is happening and to illustrate different interactions associated with digital trade and identify measurement and trade policy related issues (Table 2).[18] A few stylised examples are used in the following section to illustrate this. The first is a cross-border purchase of a book via a digital retailer or marketplace. The transaction involves a digitally enabled purchase of a physically delivered good. If purchased directly from the retailer, or a third party trader selling this product via the platform, it will be a B2C transaction, but if purchased through the marketplace from another individual it could be a C2C transaction.

Articulating transactions in this way helps identify the trade policy environment that the product will face; some preliminary measurement issues; and some horizontal issues that will likely underpin transactions. For example, in the case of the book, it is pretty clear that the product will be subject to GATT rules, and, depending on the *de minimis* provision, whether it will be subject to customs duties or not. However, even in the case of such a simple transaction, additional issues arise related to the type, and classification, of the supporting services provided affecting, in turn, the type of commitment that applies under the GATS. Lines become further blurred when considering that digital retailers or marketplaces often provide logistics services, including warehousing, to businesses selling on their platforms.

18. This typology remains an initial proposal and a basis for further discussion and further refinements may be necessary to articulate the classification.

Measurement issues also arise. First, if the book crosses the border and is below the *de minimis* threshold, it is likely that it will not be recorded in traditional trade statistics. Second, if the book is recorded in trade statistics, it will be recorded with other books which were not digitally enabled since there is currently no system differentiating goods flows according to whether or not they result from a digitally enabled transaction in the first place.

Finally, digital trade transactions also raise a set of horizontal issues relating to the transfer of data, here from retailer to consumer; or indeed access; or whether consumers have sufficient broadband speed to make the transaction in the first place. The transaction will also be subject to different payment methods, raising issues about e-payment and more generally the interoperability of systems governing the transactions such as e-signatures, privacy regulation or consumer protection.

Different transactions raise different trade policy and measurement issues. To illustrate, it is useful to unpack other transactions.

Table 2. Using the indicative typology to think about digital trade

Example	How?	What?	Who?	Trade issue	Measurement	Horizontal Issues
Digital retailer or marketplace **(book purchase)**	Physically delivered	Good	B2C (often SME) C2C	GATT, in relation to the item; GATS in relation to the intermediary Trade facilitation	Captured in trade statistics (depending on *de minimis* rule in place) but collaboration with business needed to determine how much of this trade is digitally enabled.	Data transfers, Infrastructure (access to and speed thereof), e-payment platforms, statistical classification of service, sector of sale or nature of actual activity? Interoperability, privacy regulation
Ride-sharing services	Digitally delivered or Physically delivered	Service	B2C	Domestic regulations / disruption, GATS commitments	Transport service in principle but ride-sharing company provides platform and insurance services. Mode of delivery unclear.	
3D printing	Digitally delivered or Physically delivered	Service or good	B2C B2B	GATS or GATT commitments? interoperability, IPR, competition policy.	Hard to identify transaction. Classification issues if considered as services.	
Social networking	Digitally delivered	Non-monetised service	B2C	Zero-cost to consumer, enables other (potential) cross border services	Value of service decoupled from way it is monetised so hard to trade	

Source: Authors' elaboration.

4.1. Trade in ride-sharing services

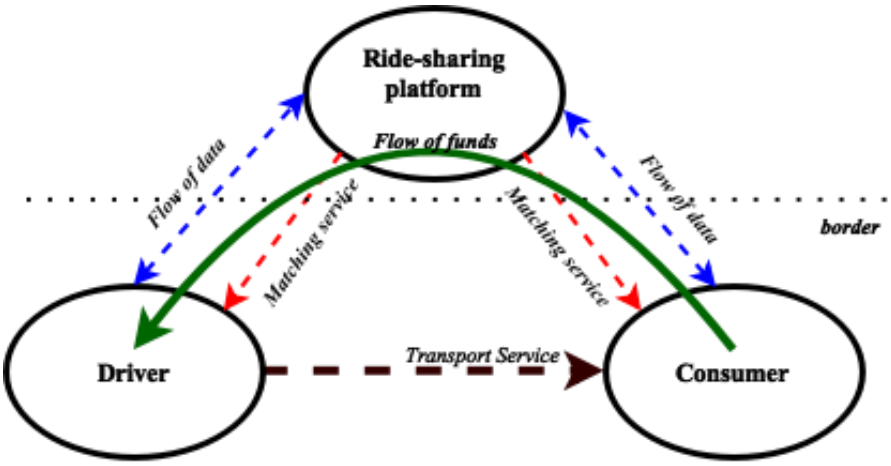
At its most basic, a ride-sharing service involves the purchase of a transport service, but how the service is provided determines whether or not there is a trade transaction in the first place and importantly how this transaction is to be measured. The example below is just one possible way that such transactions can take place and is presented for illustrative purposes.

In the "physical world", a taxi would pass in front of a customer who would pay for the ride in cash or by card. The ride-sharing matching platform adds a new tradable digital service enabling the transaction by matching the car driver and the customer and managing payment (Figure 2). The transaction between the driver and the rider (consumer) takes place in a particular country, but the supporting transactions, the

provision of the matching services, payments and insurance cover, are potentially provided from another country (assuming, as in this example that the ride-sharing platform is not operating through a mode 3 local presence). The unpacking reveals two other components – a payment made to the platform reflecting its intermediation role, and a payment to the driver who ultimately provides the transport service. Arguably the former service could be considered 'digitally delivered' and the latter 'physically delivered'.

This raises several important issues for trade policy. For example, since a ride-sharing digital platform owns no cars, should these activities be classified as a transport service or a business service? This could be important for the purposes of GATS modes 1 and 3 commitments.

Figure 2. Transactions involved in ride-sharing service



Note: The figure is schematic and is used for illustrative purposes only, it does not purport to reflect how ride-sharing businesses are run.
Source: Authors' elaboration.

4.2. 3D printing: trading goods or trading services?

3D printing, or additive manufacturing, is the process of superimposing layers of material to create structures from computer-aided design (CAD) files using a 3D printer. Although not new, 3D printing costs have fallen considerably, resulting in a wider uptake by businesses and consumers. 3D printing shortens design-to-product times by moving manufacturing closer to consumption, thereby helping reach new markets faster. It reduces the costs of building complex and customised structures; to date, it involves trade in low volume specialised products, but it has the potential to fundamentally alter the geographical location of international production (see Kommerskollegium, 2016). At these early stages, the implications of this new technology are hard to pin down, but its growing adoption raises considerable trade policy and measurement challenges.

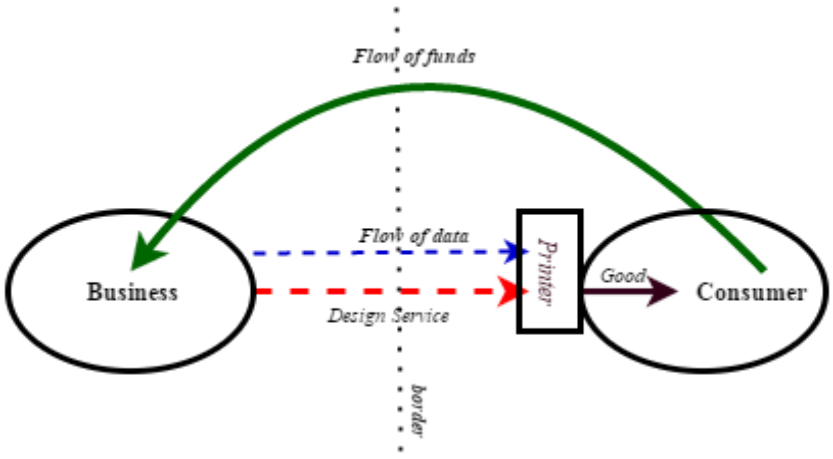
At its most basic, digital trade in 3D printed goods is similar to digitally delivered transactions: it involves a business producing and sending a CAD file to a printer in another country (Figure 3).[19] The cross-border transaction consists of a digitally delivered design service rendered into a product in the country of delivery. The international trade rules that apply to this product are uncertain: on one hand, in a 3D printing transaction delivered directly to the consumer, it is a design service which crosses the border which implies

19. As was the case of the ride-sharing example, this is just one possible way that such 3D printing transactions can take place, presented here for illustrative purposes. The examples also focus on production that is in some way outsourced; where 3D printing takes place internally in a single economic entity, outcome is clearly a good and the same classification issues do not arise.

that GATS rules should apply; on the other hand, ultimately, at the moment of consumption, this service produces a good so the transaction could also be considered a digitally delivered good and therefore subject to GATT rules.[20] The different rules applying under the GATT and GATS complicate this determination; the choice is influenced by the existence of differing acquired rights.

However, 3D printing transactions can also take different forms. For example, 3D printing may take place through an intermediary platform, where the business would place its design on the platform, the consumer would purchase it and subsequently print the good, increasing the number of transactions associated with the 3D printed good and possibly adding a cross-border flow of matching services. Alternatively, 3D printing may involve the consumer accessing the printed good via an outsourced print-shop, in which case the cross border transaction involves a B2B service link rather than a direct B2C transaction (adding an additional service to the final delivery of the product). Ultimately, and much like in the case of other digital trade transactions, the form of delivery determines both the trade policy context and the measurement implications.

Figure 3. Simple 3D printing transaction



Note: The figure is schematic and is used for illustrative purposes only.
Source: Authors' elaboration.

4.3. Social networks

Social networks also raise several important issues. While the delivery of the social networking service is similar to a traditional digitally delivered service, the transaction between the producer of the service and the consumer, or user, is not directly monetised. The delivery of the social networking service requires data to be transferred to and from the consumer. The social network then uses this data to generate revenue through selling targeted advertising space, and hence it is the delivery of the social networking service through the platform which enables the monetisation of the activities of the social networking site (Figure 4). In this instance, one of many possible ways, the B2C delivery of networking services is supported by transactions involving a B2B digitally delivered advertising service.

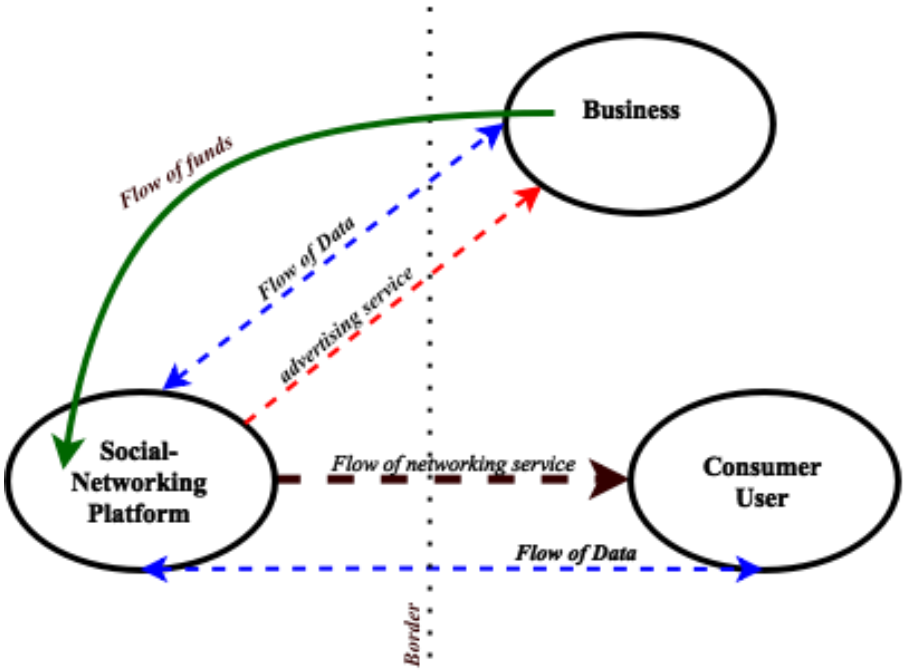
A classification issue arises from the fact that the social networking site is not directly drawing revenue from its principal activity. While the company may be classified as providing social networking services, in

20. If GATT rules apply, there is also a further issue of whether the low-volume transaction falls within de minimis provisions and therefore whether it is to be recorded or whether tariffs are payable in the receiving country. Further complications arise if the provider of the design provides it as a bundle that includes provision of the goods components whether as cross border trade or through exports.

actual fact its revenue is predominantly drawn from providing advertising services. This decoupling of payments is also an increasingly common characteristic of digital trade where services are provided but not necessarily directly monetised (twitter is an example).

Further complications arise when considering broader modes of financing, across the plethora of social media and digital platforms that currently exist. For example, advertising is not necessarily the only source of revenue and data on consumers' behaviour may directly be sold on to third parties.

Figure 4. Social networking transactions



Note: The figure is schematic and is used for illustrative purposes only.
Source: Authors' elaboration.

5. Preliminary measurement and trade policy issues

As is clear, many of the issues raised by this evolving digital trading environment are not new. However, unpacking transactions makes these more visible and can help identify current and forthcoming measurement and trade policy challenges.

5.1. Identifying measurement issues

One of the issues raised in the unpacking exercise relates to identification of the digitally enabled transaction. As noted above, even if trade transactions are recorded in official trade statistics, there is very little information about the extent to which the transaction has been digitally enabled and therefore whether it relates to traditional or digital trade. Little is known about the extent to which firms (particularly SMEs) use digital channels (whether through intermediaries or their own sites) to sell goods and services.

There are also several thorny issues related to classification, whether in terms of the activity itself – for instance if a ride-sharing activity is a transport service or an intermediation service, or in the mode of supply – whether provided by mode 3, through a foreign affiliate, or mode 1, as a direct cross-border sale. Changing modes of supply can also arise from fiscal optimisation strategies and affect measurement, depending on whether headquarters decides to record intra-firm transactions as services or as primary income.

One major measurement challenge concerns flows which do not result in a monetary transaction *per se*, but which may support one. For instance, in the case of social networks above there is no monetary transaction between the social network service provider and the user, and in terms of existing international standards, no trade. However, the information created from the use of social networks generates advertising revenues which can be a cross-border service. While the advertising monetary flow is captured in trade statistics (where the flows are cross-border), the information flows upon which they depend are not.[21]

In a similar manner, and because they are free, the international accounting system does not in general impute transactions related to the use of goods and services which exhibit the features of public goods (such as open-source or free software). Again this raises issues concerning the measurement of consumer surpluses but also potentially policies, such as anti-dumping and competition policies, if the freely available software is designed to gain market share with a view to the introduction of subsequent priced models.

In addition, a significant grey area remains on the operations of multinationals (conventional multinationals and digital intermediaries such as AirBnB and Amazon) and their ability to either record services or primary income flows depending on how they deliver services (to third parties or intra-firm). And it is not clear that consistent treatment of the underlying flows exists across countries, affecting not only estimates of international trade and investment flows but also GDP.

From the point of view of current international accounting standards, it is not generally felt that there are conceptual gaps in the frameworks. In addition, at present at least, the indications are that overall values of international trade do not necessarily significantly under-record digital or digitally related trade although, as noted above, there may be (mis)classification issues related to trade in services and primary income flows; particularly concerning transactions related to knowledge based capital (see OECD, 2017a).[22] That said, it is also generally recognised that statistics on digital trade are not sufficiently visible in a way that can adequately meet growing policy needs, nor indeed to fully address the concerns of those who feel that the current statistics on international trade are deficient.[23]

With this in mind, efforts are already underway to better reflect digital trade in international trade statistics. While the concept of digital trade has only recently entered the mainstream as a subset of broader measurement of the digital economy, there is a base of existing work upon which to build[24], as well as a

21. This raises issues concerning consumer surpluses and indeed, at the international level, who is ultimately financing those surpluses. For example, free digital products (such as a social networking site) are in general available to all with sufficient bandwidth, but the funding model (advertising) does not discriminate between countries. In other words, advertisers (and ultimately consumers through paying higher prices) in one country may be indirectly generating consumer surpluses in another.

22. In a companion paper (OECD, 2017a) members of the Working Party on International Trade in Goods and Trade in Services Statistics expressed the view that, while it is still hard to identify the digital element in trade transactions, "current trade statistics do not significantly underreport digital trade flows". The accounting frameworks introduced in the SNA08 and BPM6 remain robust and fit for purpose; however digitalisation has created and exacerbated challenges in capturing related transactions.

23. Available data, based on model surveys, mostly comes from developed countries, and often does not clearly distinguish between the domestic and cross-border elements of transactions, or between the B2C and B2B dimensions. See also Measuring the digital economy (OECD, 2014), p. 90.

24. For example, the OECD has been collecting statistics on e-commerce (B2B, B2C, C2C both within-country and cross-border) for many years through two OECD Model Surveys on ICT usage: one by households and individuals and the second by firms. The OECD, UNCTAD, UPU and WTO also lead the Technical Group working to better measure cross-border e-commerce transactions (see below). See also *Measuring the Digital Economy* (OECD, 2014).

number of new initiatives by the international statistics community that have, at least in part, helped to improve statistics on digital trade. For example, Measuring Digital Trade features highly on the agenda of the OECD Working Party on Trade in Goods and Services Statistics. In addition, the Task Force on International Trade Statistics (TFITS), co-chaired by the OECD and WTO and responsible for developing and advancing methodological standards in measuring international trade statistics (IMTS 2010, MSITS2010), has been leading and coordinating international efforts to develop a conceptual measurement framework, in line with that described above, with other international organisations, including UNCTAD, the IMF, and the World Bank Group.[25]

5.2. Identifying trade policy issues

A range of trade policy issues also emerge from the unpacking exercise. An overarching one is the degree to which the multilateral system is able to deal with the changes brought by digital trade. While rules were devised to be technologically neutral, meaning that negotiated outcomes apply in the context of technology driven changes to trade relations, some are questioning whether there is a need for further updates or clarifications. But it is important to put matters into context. The WTO has been grappling with digital trade related issues for some time: e-commerce was first discussed in 1998, and a moratorium on applying duties on electronic transmissions was agreed. Moreover, the blurring of the lines between goods and services has been debated in the context of discussions on the status of 'software' on a disk for nearly two decades.

A key role of the multilateral trading system is to level the playing field so that countries compete on equal terms. The question is not whether the system is equipped or not to deal with the changes that digital trade brings; most, if not all, of the existing provisions that have been negotiated apply equally to digital trade. Rather, the question is whether the system is in need of further clarifications on particular issues so that it continues to be fit for purpose for the coming 100 years of technological change and that regulatory and public policy objectives and the benefits of digital trade can both achieved in a fast-moving environment.

In this context, the aim of this section is to identify a non-exhaustive number of preliminary trade policy issues which arise in this new digital trade environment. This can be approached by identifying how trade policies shape the *how* and the *what* of digital trade, as outlined earlier in the document. And, to a broader extent, by trying to identify how different trade measures can affect different aspects of digital trade. In this context, it may be useful to consider both the way in which some traditional measures affecting trade have a greater, or different, impact on digital trade and any new measures affecting digital trade.

5.2.1. Trade policies and what we trade

The bundling of goods and services and the rise of new technology-driven products and markets such as 3D printing and the IoT, call for clarifications on what rules might apply to different products, whether GATT or GATS, and perhaps a re-think on how to best approach new negotiations. In the face of rapid technological change, it has been proposed that a negative rather than a positive list approach to services liberalisation would help liberalisation efforts and avoid bottlenecks in the future. The classifications on which services negotiations are based are already being updated, but as new activities continue to be created, it remains to be seen whether the revised classifications will be able to encompass these without becoming outdated.

With the digital transformation changing the tradability of services, as well as facilitating switching between modes of supply, further analysis will be needed to identify how trade rules may condition or favour one mode of service delivery over another and how different measures are likely to affect these modes.

25. The World Customs Organisation (WCO), a member of the TFITS, has also recently launched an initiative to better identify and monitor e-commerce transactions in customs records (WCO Working Group on E-Commerce – WGEC).

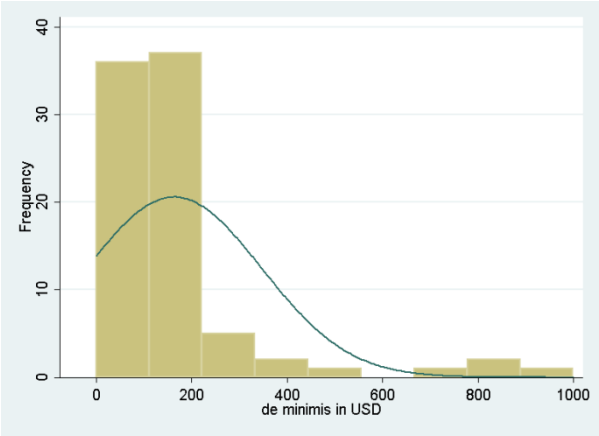
As the information era continues to unfold, further challenges will also arise relating to data flows that are not directly monetised and therefore currently not considered as trade flows. The indirect monetisation of the flow of information from an individual to a social network underscores that there is value to information and in this respect that one might be able to 'pay' for services by sharing personal information.[26] If information or data is similar to a natural resource and consumers are able to leverage their own information, much like companies are currently leveraging the information of their customers, there might be a need to revisit the non-monetary dimension of information flows and whether this is a direct trade policy issue or not.

5.2.2. Trade policies and how we trade

With more small packages crossing borders more efforts will be needed to identify the impact of having to handle more packages on customs authorities and to determine the impact of different *de minimis* provisions on both firms and consumers. Some countries don't actually have a *de minimis* provision (e.g. Bahrain, Costa Rica, El Salvador, Guatemala or Saint Lucia) meaning that their customs inspect and collect duties, if applicable, on all arriving packages. But for those that do there is a wide variation in the thresholds (Figure 5): from as low as USD 0.33 in the Philippines to as high as USD 1 000 in Azerbaijan (values for April 2016). In the EU, duties are not collected for products below a USD 170 threshold and in the US the threshold is USD 800. Not having a *de minimis* threshold can cause longer clearance times ill-suited to a world of low value or small parcel trade and just-in-time delivery. This can result in disproportionate trade costs relative to the value of the trade flow and acts as an impediment to digital trade which could lead consumers favouring domestic over foreign retailers. This question is only beginning to receive interest in the trade research community. Further work is needed to establish how *de minimis* provisions can shape digital trade.

Figure 5. De minimis thresholds (2016)

a. frequency distribution



b. Thresholds in selected countries

	De Minimis USD
Australia	756
Brazil	50
Canada	15
China	8
EU	170
India	150
Indonesia	50
Japan	90
Korea	150
Mexico	300
USA	800

Source: Global Express Association (figures from April 2016) http://www.global-express.org/assets/files/Customs%20Committee/de-minimis/GEA-overview-on-de-minimis_April-2016.pdf.

Data flows also support more efficient customs and trade logistic services and therefore the implementation of the trade facilitation agreement (OECD, 2017c). Further attention on the issues that underscore the trade facilitating, or at the border, element of trade is needed. Faster customs clearance that does not undermine risk-based management systems, or greater support for interoperability between customs

26. Consumers are already 'paying' for services by sharing personal information but they are often not aware of the extent to which their personal data is being used.

authorities and with respect to handling pre-shipment notices, acceptance of e-signatures and e-documents will contribute to smoothening trade transactions helping SMEs and consumers alike.

Growing interconnectedness and a greater demand for just-in-time delivery also means that trade needs, more than ever, to be faster and more reliable. In this environment, both the quantity and quality of exchanges of information will grow. Digitalization of information paves the way for effective identification of risks and management of global supply chains. Large volumes of data are needed to meet the growing demands for the tracking and traceability of products across borders. For instance, faster and more reliable management of data across borders requires interoperability of data exchange systems and harmonization of e-certificates.

Platforms are increasingly becoming gateways for market access both for large and small firms and consumers. By reducing costs of intermediation consumers are able to find better and cheaper matches to their preferences. Yet the competitive environment that these platforms face remains uncertain. Competition policy, a remit of national authorities, can find it hard to regulate global marketplaces. The platforms themselves might also be increasingly stressed when confronting liability issues from third party vendors. And there are also argued to be growing dangers of market dominance in the increasingly winner-takes-all environments. These issues, while not directly related to trade policy, might have an incidence on the way that trade takes place and will also require further analysis.

With rising automation in the context of a wider use of artificial intelligence and in the advent of robotisation, new issues about the role of robots as economic agents might arise. Indeed with the IoT, algorithms and robots, or devices, might increasingly play a role in both the purchase and sale of goods and services. If a fridge can alert its owner that it is running low on milk and the owner can programme the fridge to directly purchase milk from a global retailer then there is scope for robots to be increasingly involved in trade transactions. While this might not have direct trade policy consequences at the moment, the robotisation and mechanisation of the economy might, in the future, raise new issues related to the actors involved in new trade transactions (and also require updating the typology in Section 3).

The role of data flows in enabling the digital trading environment will also require further attention. Policy design should seek to nurture digital trade by enabling the movement of data across borders but it should not neglect that countries have different policy stances on issues such as privacy or indeed security. Trade policy should therefore focus on continuing to ensure that appropriate measures are available for the pursuit of legitimate public policy goals in a way that is not more trade distorting than necessary to achieve the required policy objective in order to preserve the significant benefits from an open digital environment. In this context, more targeted efforts to better identify the role that trust plays in enabling digital trade transactions: whether from the perspective of the firm, through compliance with regulatory frameworks and standards, or the consumer, by ensuring that these are protected and well informed, are also needed.[27]

Finally, and in view of making the gains from the digital transformation more inclusive, further attention to the development aspects, or to how countries at different stages of development engage in digital trade transactions, will be required. Countries are at different stages of readiness for the digital age and this will affect the extent to which they can participate in digital trade. Although they might face different policy challenges than developed countries, it is important that developing countries do not neglect adapting regulatory frameworks to help face forthcoming challenges. Countries at different levels of development also have an opportunity to leapfrog or move ahead in policies less constrained by legacy systems, and getting the policy-mix right early on will allow them to better draw benefits from the digital transformation.

27. These issues are being explored in the OECD's horizontal project Going Digital, in which TAD is contributing to bring the trade perspective to these issues.

6. Moving forward on digital trade

This paper has set out to identify some of the key changes that the digital transformation brings to the way international trade takes place. It has highlighted how digitalisation changes what and how we trade, although not why we trade, and identified data flows as a key enabling element of this new trading environment.

The paper has proposed a flexible and simple typology of digital trade in an effort to better highlight some of the trade policy and measurement issues raised, highlighting that how a transaction takes place will determine the trade policy issues raised; and showing how classification issues as well as non-monetary flows of information condition the new trading environment.

Finally, the paper has highlighted a set of measurement and trade policy issues that might require further attention to better understand the consequences of digital trade.

Moving forward on digital trade is a question of refining the different aspects that require further analysis, whether on measurement, trade policy or by identifying specific barriers to digital trade. In this context, the present paper provides a framework for analysis and some initial reflections which can inform more targeted analysis of the trade issues raised. In the process the typology itself might require revisiting in light of new analysis.

Ultimately, the aim of future work on digital trade should be to provide practical analysis to current and future trade policy issues raised in the digital trade environment. By framing concepts and developing a framework for their analysis, the paper aims to contribute to a better understanding of digital trade and to inform policy makers of the forthcoming challenges that they will need to face in an effort to make the most out of digital trade and ensure that the benefits of the digital transformation are reaped more inclusively.

References

Akerlof, G. (1970), "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism", *Quarterly Journal of Economics*, 84 (August 1970), pp. 488-500.

Baldwin, R. (2016), The Great Convergence, Cambridge, MA: Harvard University Press.

Baldwin, R. (2011), "Trade and Industrialization after Globalization's 2nd Unbundling: How Building and Joining a Supply Chain are Different and Why it Matters", *NBER Working Paper* 17716.

Baldwin, R. and J. Lopez-Gonzalez (2015), "Supply-chain Trade: A Portrait of Global Patterns and Several Testable Hypotheses", *The World Economy*, 34(2015), pp. 1682-1721.

Bernard A., M. Grazzi and C. Tomasi (2011), "Intermediaries in International Trade: Direct Versus Indirect Modes of Export", *NBER Working Paper* 17711.

Coase, R.H. (1937), "The Nature of the Firm", *Economica*, 4(16), pp. 386-405.

ECIPE (2016), "Digital Trade Estimates Report", *www.ecipe.org*.

Fleuter, S. (2016), "The Role of Digital Products Under the WTO: A New Framework for GATT and GATS Classification", *Chicago Journal of International Law*, Volume 17, Number 1.

Grossman, G. and O. Hart (1986), "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", *Journal of Political Economy* 94(4), pp. 691-719.

Kommerskollegium (2016), "Trade Regulation in a 3D Printed World", National Board of Trade, April 2016 – First Edition. ISBN: 978-91-88201-12-6.

OECD (2017a), "Measuring Digital Trade: Toward a Conceptual Framework", OECD Working Party on International Trade in Goods and Trade in Services Statistics, STD/CSSP/WPTGD(2017)3, March 2017, http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=STD/CSSP/WPTGS(2017)3&docLanguage=En.

OECD (2017b), Key Issues for Digital Transformation in the G20, OECD Publishing, Paris. https://www.oecd.org/g20/key-issues-for-digital-transformation-in-the-g20.pdf.

OECD (2017c), "Digital Connectivity and Trade Logistics – Getting Shipped, Across the Border and Delivered" in *Aid for Trade at a Glance 2017: Promoting Trade, Inclusiveness and Connectivity for Sustainable Development*, WTO, Geneva/OECD Publishing, Paris.

OECD (2014), *Measuring the Digital Economy: A New Perspective*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264221796-en.

OECD (2013a), The OECD Privacy Framework, OECD Publishing, Paris, https://www.oecd.org/sti/ieconomy/oecd_privacy_framework.pdf.

OECD (2013b), Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data, OECD Publishing, Paris, https://www.oecd.org/sti/ieconomy/2013-oecd-privacy-guidelines.pdf.

OECD (2013c), "Empowering and Protecting Consumers", in *The Internet Economy on the Rise: Progress since the Seoul Declaration*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264201545-8-en.

OECD (2011), *OECD Guide to Measuring the Information Society 2011*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264113541-en.

Shapiro, C and H. Varian, H, (1999), Information Rules, Harvard Business School Press, Boston, MA.