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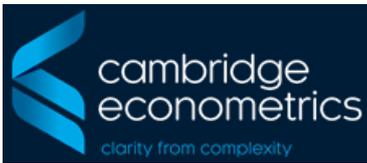
Analysis

Understanding and measuring cross-border digital trade

Final Research Report

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This is a report of research carried out by Cambridge Econometrics, on behalf of the Department for International Trade and the Department for Digital, Culture, Media and Sport.



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Research contractor: Cambridge Econometrics, Cambridge UK

Research Authors: Michael Lee, Mary Goldman, Lucy Clements, Jamie Pirie, Bence Kiss-Dobronyi, Graham Hay

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Executive Summary

Despite its growing importance, the scale and nature of cross-border digital trade is not well understood

Efforts to define digital trade as a concept have until recently been limited

- Cross-border digital trade has expanded rapidly in recent years, facilitated by improvements in technology and the emergence of new digital products and business models; one study estimates that global data flows grew 45-fold over 2005-2014¹. However, despite the growing importance of digital trade, little is known about its nature and scale, raising questions over the ability of current data collection methods to keep pace with the rapidly changing nature of modern trade.
- Until recently, a lot of the literature in the digital trade domain had focussed on concepts that are wider in coverage (such as the digital economy), or captured specific components of digital transactions only (such as electronic ordering or “e-commerce”). Efforts to define the *cross-border* dimension (which is the focus of this report) have been slow to emerge.
- At the same time, there is a lack of data to understand the scale and trends of digital trade. The lack of a common conceptual definition and understanding of digital trade have contributed in part to the lack of data.
- Lack of understanding about the scale and impacts of digital trade poses major challenges for policy makers who need better evidence to understand the implications of digital trade and develop appropriate policy responses.
- The purpose of this report, funded jointly by the Department for International Trade (DIT) and the Department for Digital, Culture Media & Sport (DCMS), is to advance understanding of cross-border digital trade. It is the first attempt in the UK to discuss in a systematic way the measurement challenges in this area, collect relevant statistics for the UK and make recommendations for improving these statistics.

This has contributed to the lack of empirical data on the scale and trends of digital trade activity

A single, comprehensive organising framework is emerging

The OECD-WTO-IMF framework is a useful starting point for understanding and measuring the different components of digital trade

- The strongest effort to develop a coherent and comprehensive definition that captures the key features of the different components of cross-border digital trade is found in work led by the OECD, WTO and the IMF.
- Their work to develop a Handbook on Measuring Digital Trade aims to provide a conceptual framework of digital trade and is an important starting point on how to practically measure the different components of digital trade. The Handbook is a “living” document - to be revised/updated regularly as new forms of digital trade emerge, and measurement methods become more developed.
- One of the distinguishing characteristics of the conceptual framework is the emphasis on the “nature” of the trade; the OECD/WTO/IMF defines digital trade as trade that is “digitally ordered” (synonymous to e-commerce) and/or “digitally delivered” (services transactions that are delivered remotely through computer networks). These forms of digital

¹ McKinsey Global Institute (2016).

trade are not mutually exclusive - developing an estimate of digital trade requires a consideration of how best to account for the overlap across these categories.

Existing official data sources provide only a partial picture of cross-border digital trade activity

Existing official statistics do not capture all elements of cross-border digital trade activity and the monetary value of this activity

- Reliable and internationally comparable statistics on cross-border digital trade that are coherent with National Accounting frameworks are currently limited. Existing official statistics capture some but not all aspects of cross-border digital trade. Part of the problem is that existing statistics are based on surveys that were not originally designed to capture cross-border digital trade activity, and are therefore inadequate for such purposes.
- This is reflected in the literature on costs and benefits of digital trade, which, given the absence of data, is largely conceptual. The available empirical analyses identified do not use a measure of digital trade directly.

The monetary value of cross-border e-commerce, and therefore total (e-commerce + digitally delivered), transactions cannot be fully estimated

Existing surveys only capture the proportion of businesses and households engaged in cross-border e-commerce trade

- E-commerce is an important component of digital trade. National statistical offices, including the ONS, publish a limited set of statistics on cross-border e-commerce trade based on information collected from business and household surveys.
- A major limitation of these surveys is that they do not explicitly capture the value of e-commerce transactions and do not distinguish between domestic and cross-border trade. In the limited cases where a distinction is made, the estimates do not provide information on the monetary value. In addition, the surveys cannot identify the nature of these transactions (i.e. whether they are digitally ordered, digitally delivered or both) or the role played by digital intermediaries in these transactions. Furthermore, the surveys typically have small sample sizes, impacting on the quality and granularity of the data (breakdowns by type of product traded and geography are limited).

Value estimates of digitally delivered services trade are possible using existing trade data

The UK had a surplus in “potentially ICT-enabled” services trade of £114bn in 2018

- While existing e-commerce statistics cannot identify the monetary value of UK cross-border e-commerce trade, it is possible to produce an estimate of the value of UK trade in *potentially* digitally delivered (or “*potentially* ICT-enabled”) services using Extended Balance of Payments Services (EBOPS) statistics. These are services that can predominantly be delivered digitally.
- First estimates for the UK, calculated for this report, show that the UK had a trade surplus in “potentially ICT-enabled services” of £114bn in 2018. In nominal terms, this surplus has increased more than 4-fold since 1997 when ONS records began, driven by strong growth in exports of financial and professional business services. Overall exports of potentially ICT-enabled services are estimated to be around £221bn in nominal terms in 2018, with annual growth averaging 5.8% since the end of the global financial crisis over 2010-2018.

Such estimates are imperfect however

New experimental ONS statistics capture trade in services that is actually, as opposed to potentially, delivered remotely/digitally. They show that the UK had a trade surplus of £99.2bn in digitally delivered services in 2018

- This is the first time these estimates have been generated for the UK. However, although the estimates rely on robust official statistics, they are imperfect. This is partly because they capture types of services that are *potentially* but not necessarily *actually* delivered digitally.
- Experimental statistics on UK services trade by modes of supply, published recently by the Office for National Statistics (ONS), address this important limitation. These new statistics provide a direct measure of trade in services that is *actually* delivered digitally via Mode 1, assuming that remote delivery (Mode 1) broadly corresponds to digital delivery. The estimates have been made possible by the inclusion of an additional question in the 2018 ONS International Trade in Services (ITIS) survey, which asks UK businesses to identify the proportion of their trade in services that is delivered remotely. The estimates show that the UK exported £190.3bn digitally delivered services (representing 67.1% of total UK services exports) and imported £91.1bn digitally delivered services (or 51.7% of total UK services imports) in 2018. As a result, the UK recorded a trade surplus of £99.2bn in digitally delivered services in 2018.
- Although they fill a big gap in existing statistics, these estimates do not provide a full picture of the scale of UK cross-border digital trade as they miss important components, such as digitally ordered goods and digitally ordered services that are not digitally delivered. Furthermore, they cannot identify services transactions via digital intermediary platforms.

Overall, sizeable data gaps and measurement challenges remain, requiring more work to generate more accurate and detailed data on UK digital trade

Approaches to collect more accurate and detailed data on UK digital trade should be designed with the biggest measurement challenges in mind

- Given the available sources and the definition of digital trade presented by the OECD-WTO-IMF framework, the biggest challenges to measuring digital trade relate to:
 - **Transactions involving intermediaries.** The measurement of cross-border transactions involving intermediaries is considered as one of the most complex aspects of digital trade, given the need to identify the intermediation fee in addition to the goods and services being exchanged; any cross-border activity from buyer-seller transactions via an intermediary platform should be accounted for as part of digital trade. Not all of these activities are easily identifiable or measurable.
 - **(Free) cross-border data flows** that involve no monetary transactions are considered within the OECD-WTO-IMF framework under the definition of “non-monetary” digital trade. Currently, there is very little information to inform how this component can be accurately measured.
 - **Imports of e-services (such as digital downloads, or streaming services) by households.** These are not captured in existing surveys.
 - **De minimis trade.** Sizeable challenges persist with measuring low-value but high-volume parcel trade below customs thresholds.
 - **Options to measure emergent innovations in the digital domain.** New innovations (such as cloud computing, or crypto-assets) are likely to pose challenges for measuring cross-border digital trade. Efforts to consider how best to measure these are largely in their infancy, and are likely to require consideration beyond the scope of this project.
- In light of these challenges, numerous options are available to fill the data gaps. The preferred option is additional surveying of households and

businesses, either through creating new bespoke surveys, or exploiting the potential of existing surveys.

In the short term, including recommended optional Eurostat questions to existing ONS surveys could produce estimates relatively quickly

- In the short term, there are quick wins to be made by including the recommended optional Eurostat questions (currently not implemented) or exploring the potential for adding new questions to existing ONS surveys. The questions could build on existing questions that only capture the incidence of cross-border e-commerce, to derive an estimate of the monetary value and capture more fully the different dimensions of e-commerce trade. This option is relatively less time and resource-intensive; existing ONS surveys also have established sampling methodologies and quality characteristics. However, there is less scope for exploring the characteristics of digital trade in detail, compared to new bespoke surveys focussing on digital trade specifically.

Developing bespoke surveys provides the scope to consider different parts of digital trade in more detail

- In the longer term, dedicated surveys are preferred. Bespoke surveys offer the flexibility to identify in more detail the different components of digital trade, such as distinguishing between types of transactions (digitally ordered/delivered/both; B2B/B2C/C2C etc.), products (goods/services), trade flows (exports/imports), partner countries, and goods and services directly purchased via businesses' websites/apps and via intermediaries.
- Developing new surveys can be time and resource-intensive. A less resource intensive option is to introduce modules with questions aimed at measuring digital trade in regular surveys of businesses and households conducted by the ONS. Large and well-established annual surveys, such as the Annual Business Survey, the Labour Force Survey or the Living Costs and Food Survey, could be useful starting points to explore the scope for additional questions to delineate the dimensions of digital trade and reduce the potential for double counting.
- Trade involving intermediaries could be separately identified through bespoke surveys. In the first instance, bespoke surveys could identify the value of transactions passing through digital intermediaries. In addition, we recommend exploring the possibility of adding distinct questions within bespoke business surveys that would be answered by intermediaries to measure the value of cross-border intermediation fees. For this option, there would be an additional challenge of identifying the intermediary firms.
- On digital delivery, we recommend that the ONS should continue its efforts to further develop its experimental modes of supply data, including producing more robust estimates of Mode 1 trade by partner country.

Innovative methods such as web-scraping and microdata linking should also be considered

- Relying on survey methods in isolation is unlikely to be sufficient to measure all aspects of UK digital trade, especially given the uncharacteristic forms that digital trade sometimes takes (e.g. data flows, de minimis trade, or intermediaries). We therefore judge that it would be useful to explore other less conventional techniques, such as using credit card data to capture de minimis trade, web-scraping techniques, and electronic identification of digitally ordered parcels at customs. Microdata linking also offers a promising avenue in this domain. In the second stage of this project, we aim to link the ONS E-Commerce and ICT Activity and International Trade in Services microdata to provide insights on the characteristics of businesses engaging in digitally ordered/delivered services trade.

1 Introduction

1.1 Background

This project was funded jointly by the Department for International Trade and the Department for Digital, Culture, Media & Sport. Its overarching aims are to provide an up-to-date understanding of how cross-border digital trade² is defined and measured, how well currently available data measure digital trade; and from this, identify ways to fill gaps in existing data and explore options for better measuring digital trade.

Understanding what digital trade is and its scale is important, given its increasing prominence in the modern economy, and the complexity of the domain. Given that the nature of digital trade is very different to traditional trade, this also has implications for policy-makers and legislators to design regulation that sufficiently addresses the challenges associated with these forms of cross-border transactions.

Related to this is the understanding that digital trade presents an opportunity for economic growth in the modern-day economy. This supports governmental objectives of breaking down trade barriers and promoting UK competitiveness, as well as growing a strong, inclusive and innovative economy and facilitating efficient digital evolution. The gains associated with facilitating digital trade would contribute to national economic prosperity.

Within this context, improvements in statistics to measure digital trade provide the first step to effective policy-making to encourage, and address the challenges of, digital trade. This project, therefore, seeks to update the evidence base of what is currently available in terms of data on digital trade, and in doing so, identify potential options for estimating the value of digital trade given the current data gaps.

1.2 Objectives of the study

Given these overarching aims, the project consists of the following requirements:

- to review the evidence base on digital trade to identify, and clarify understanding on, definitional issues; measurement and methodological challenges; coverage of data on digital trade in official statistics and their associated strengths and weaknesses; and non-conventional methods to estimate value of digital trade (such as using credit card data);
- to identify possible sources of data on digital trade; compile statistics for the UK; identify data gaps and propose ways to fill them;
- to investigate the potential of using micro-data for understanding digital trade³.

² This study focusses on cross-border digital trade; for brevity, the terms “cross-border digital trade” and “digital trade” are used interchangeably throughout the report.

³ Conducted in the next phase of the project.

1.3 Structure of the report

Chapter 2 provides an overview of efforts to define the concept of digital trade, focussing especially on frameworks that would facilitate *measuring* the scale of digital trade. Chapter 3 focusses on the available data for the UK from official sources, noting, however, that existing data do not capture or distinguish cross-border digital transactions very well. Chapter 4 explores the range of options to better measure/identify digital trade, and which are considered most suitable to pursue. Chapter 5 offers concluding remarks.

2 Understanding digital trade

Key points

- Despite the growing importance of digital trade, a common understanding of what constitutes digital trade is lacking.
- Much of the relevant literature focusses on concepts that are broader in scope but are related to, or overlap with, digital trade. Even attempts to define concepts that are close to digital trade (such as e-commerce) generally fail to capture key aspects, including the type of goods and services ordered; the location of the buyers and sellers; whether the products are ordered and/or delivered digitally; whether the transaction is cross-border; and, the value of the transaction.
- Work by the Organisation for Economic Co-operation and Development (OECD), the World Trade Organisation (WTO) and the International Monetary Fund (IMF) to develop a conceptual framework provides a good foundation for identifying and defining the different components of digital trade. The framework departs from traditional (product or sector-based) methods of measuring digital trade by treating the *nature* of the transaction as the key factor, rather than the nature of the product. Digital trade is defined as trade that is digitally ordered and/or digitally delivered.
- The framework is currently a “living” document that continues to evolve and be refined as measurement methods advance. As such, there are still significant measurement challenges that need to be addressed, including:
 - accounting for trade of “free” digital services.
 - accounting for digital transactions that may sit within multinational enterprises (intra-firm digital transactions).
- Digital connectivity decreases costs (particularly distance, information and communications costs) which is one of the main benefits of digital trade, while the literature on digital trade costs points to regulatory and cultural factors.
- Key barriers to digital trade include digital-specific regulations, readiness of infrastructure and the availability of support services such as payment systems and logistics.

2.1 Introduction

Despite the growing importance of digital trade, little is known about its scale

Digital trade has expanded rapidly in recent years, facilitated by improvements in technology and the emergence of new digital products, business models and servitisation⁴. However, despite the growing importance of digital trade, little is known about its scale. Reliable and internationally comparable statistics on digital trade that are coherent with National Accounting frameworks are limited. A lack of understanding about the scale and potential impact of digital trade presents significant challenges for policy makers in

⁴ Servitisation refers to manufacturers providing digitally-enabled services alongside physical goods.

designing appropriate mechanisms to promote, and address the challenges of, digital trade.

Part of the challenge of understanding the scale and trends of cross-border digital trade activity lies in the difficulty of drawing clear-cut boundaries around what digital trade as a concept should cover, and in establishing a universally agreed definition.

The lack of commonly accepted principles reflects the shortcomings of existing classifications and concepts to identify and isolate digital trade. While there are efforts to make better use of available data to understand aspects of digital trade, measuring digital trade systematically and comprehensively requires the development of new concepts and frameworks. Efforts to do so are ongoing; this is discussed in more detail in section 2.3, following a discussion of the costs, benefits and barriers to digital trade in section 2.2. Nevertheless, it is important to be aware that the multi-dimensional nature of digital trade means that there are a number of outstanding conceptual and measurement challenges; these are explored in section 2.4. Section 2.5 offers concluding remarks.

2.2 Digital trade: concepts, benefits, costs and barriers

Existing attempts to define digital trade do not cover all aspects of digital trade

With the exception of the framework developed by the OECD, WTO and IMF – discussed in further detail in section 2.3 – there have been few attempts to formalise or systematically define digital trade as a concept. Much of the research has focussed on concepts that are either broader in scope than, related to, or overlap with, digital trade (such as the digital economy), or specific aspects of digital trade, such as e-commerce and Information and Communication Technology-enabled (ICT-enabled) services.

In the case of the digital economy, there is no single established definition of what it may constitute⁵; definitions vary in their coverage of types of goods and services considered. For example, a paper from the United Nations Conference on Trade and Development (UNCTAD, 2017) considers that there are broadly three levels of digital economy:

- 1 Core Digital IT/ICT sector – The ICT-producing sector comprising of both IT infrastructure and IT services.
- 2 Narrow scope (Digital economy) – Adds to the core definition with Digital services (e.g. outsourced call centre services) and the platform economy (e.g. Facebook and Google).
- 3 Broad scope (Digitalised economy) – includes the use of various digital technologies for performing activities such as e-business, e-commerce, automation and artificial intelligence.

The literature on the benefits, costs and barriers of digital trade (see below) usually uses related concepts (see for example, European Commission Joint Research Centre (JRC), 2013; JRC, 2015a; OECD, 2018b).

⁵ The OECD has set up an Advisory Group on measuring GDP in a Digitalised Economy, tasked to develop a common framework for measuring the Digital Economy (OECD, 2018a).

Benefits of digital trade

There is a considerable body of literature focusing on the cost and benefits of digital trade and the barriers that limit growth in digital trade. The OECD sets out benefits as fitting under the categories: scale, scope and speed of trade (OECD, 2018b). In the following section, scope and scale is investigated in detail. The literature is scarcer about how the speed of trade is affected by digitalisation. It is evident that direct digital communication, electronic payments and the ease of coordination of global supply chains make digital trade quicker compared to conventional trade (OECD, 2018b), enabling a higher rate of trade and leading to higher economies of scale and lower time and error costs.

Looking at scope and scale benefits, these can be translated into two main categories of economic benefits: (1) the lowering of costs traditionally connected to trade (variable costs, scale) and (2) the lowering of entry barriers (scope), which is the fixed cost of market entry. One consequence of these is very often a larger pool of reachable customers, who can be reached through additional channels and can be serviced with lower prices. In turn, this can lead to an increasing demand for goods and services and, consequently, higher employment in the digital economy (as indicated in United States International Trade Commission (USITC, 2014).

Digital trade reduces transaction costs in international trade

Economic benefits are largely attributed to the shrinkage of trade distance costs that digital trade enables. These costs incorporate geographical distance, but also many more cost factors associated with trade such as information seeking and search costs, cultural or regulatory costs. While overall trade distance costs are decreasing with digital trade, the direction of digital trade's impact on these individual factors can be bidirectional. It has been shown that geographical distance is less important in digital trade (OECD, 2018b), which is explained by a reduction of information costs (JRC, 2013) and other related cost factors, such as search costs (World Bank, 2017). Thanks to digital trade, it is less costly for customers to research products or to gain knowledge from a more extensive network of suppliers. A simple example is that they can spare the costs of travelling to their potential partners. Gravity models used to analyse this phenomenon support these findings (see, for example, JRC, 2014; JRC, 2015a; OECD, 2018b).

Reducing the cost of importing and exporting goods has also led to savings for consumers. Research conducted by the JRC suggests that increased digitalisation and reduced prices have increased consumer spending by 1% and driven an increase in GDP of 0.14% within the EU, compared to a baseline without increased digital trade and e-commerce activity (JRC, 2015a).

The cost reduction effects are even more substantial for those services that are digitally deliverable in addition to being digitally ordered. Using a gravity-model approach based on the OECD's Trade in Value Added (TiVA) database to analyse services exports, a report by the OECD (2018b) found that digitally deliverable services profit more from increased digital trade.

Decreasing trade distance costs means new opportunities

On the international stage, decreasing distance costs can mean new opportunities for businesses. Smaller countries and businesses can more readily become part of the international trade ecosystem. It is suggested that decreasing distance costs is a result of lowering barriers to entry⁶ for firms previously too small to enter the international market (World Bank, 2017; Lendle, 2013; JRC, 2013). This allows smaller firms to enter multiple markets at a relatively low cost.

Lower distance costs and lower barriers of entry together lead to increased competition. This in turn can lead to new technology adoption (World Bank, 2017; Ater & Orlov, 2015; Brown & Goolsbee, 2000) and a potential decrease in prices. As price effects diffuse to non-digital markets, this amplifies the positive consumer welfare effect. The resulting increase in demand drives employment in digital intensive sectors and leads to an overall employment gain according to USITC (2014).

At the same time, there may be a possible increase in the variety of goods available (JRC, 2013; JRC, 2015a), thereby benefiting consumers. The impact of variety effects is quantified by Brynjolfsson, Smith, & Hu (2003) using estimated sector elasticities based on the Lerner index and data on obscure books. Their paper concludes that digitalisation of the analysed sector led to a welfare gain between USD 0.7-1.0bn in 2000. The same method was used by Civic Consulting, who estimated on behalf of the European Commission Executive Agency for Health and Consumers that in 2011 the effect of lower prices online potentially led to consumer welfare gains of about €2.5bn. This was complemented with an effect of increased online choice estimated to worth €9.2bn, thus indicating total gains of €11.7bn in consumer welfare gains (European Commission Executive Agency for Health and Consumers, 2011).

While all of these effects could be beneficial for the consumers, it should be noted that for incumbent local businesses these developments could have negative effects on firm profitability if they exert downward pressure on prices or increase demand for higher quality products (or both). This may require firms to introduce new technologies and adapt to changed market conditions. At the margin it will force some firms to leave. This may be especially true for businesses that do not counter the increased import competition by embracing the export opportunities on offer.

Costs of digital trade

While these impacts are providing important consumer benefits, there are also some costs associated with the adoption of digital trade, mostly felt on the supply side. Most are related to trade barriers encountered in digital trade.

Digital trade can generate additional compliance costs

As the understanding of digital trade is still underdeveloped relative to other conventional types of trade (and in conjunction regulation and definitions of digital trade are less well-established), the need to be compliant with new market regulations (OECD, 2018b; Wunsch-Vincent, 2008) could mean higher legal costs compared to offline trade. Regulations specific to digital trade, such as data protection or privacy laws, can put additional burdens on firms with operations in the countries which introduce them, as firms need to invest in

⁶ Examples of these barriers are: research into new markets; establishing new distribution channels; or commissioning local advertising.

new, local technical capacities (European Centre for International Political Economy (ECIPE), 2014b; USITC, 2014).

Markets where contract enforcement is perceived to be lower can require investment in a local presence

An additional source of cost is the perceived higher risk of poor contract enforcement in the context of digital trade between different jurisdictions (JRC, 2014). Developing feedback mechanisms and guarantees, such as a local presence, need to be financed in order to ensure trust and thus facilitate online shopping (JRC, 2013; JRC, 2014; World Bank, 2017). These costs are felt less in local non-digital markets, where traditional forms of regulated mechanisms such as local consumer protection already exist and where producers do not need to overcome fears stemming from contract enforcement across jurisdictions.

Digital trade cannot bypass cultural and linguistic barriers

Furthermore, while distance costs are decreasing with digital trade, cultural and linguistic barriers seem to be strengthening in the digital market. Multiple studies found a negative effect of cultural, institutional and linguistic differences on digital trade, a stronger effect than what can be seen in offline trade (JRC, 2013; JRC, 2014). However, this could be explained by the diminishing impact of distance as a factor compared to offline trade, as in offline trade geographic distance also likely captures cultural and linguistic differences.

Barriers to digital trade

Barriers to digital trade can be categorised as follows⁷:

- **Digital connectivity and infrastructure**

Digital connectivity and infrastructure includes all the technological and infrastructure requirements that need to be overcome – by businesses and consumers alike – in order to have efficient digital connectivity and thus digital trade. The state of the infrastructure, accessibility, and affordability, which are linked to infrastructure regulation and competition policy for the telecommunication sector, are the most important (OECD, 2018b; Wunsch-Vincent, 2008), but the level of digital skills also plays an important role.

- **Support services**

Services such as logistics, postal or payments play an important role in supporting or facilitating digital trade. The presence of efficient logistics systems in the trading countries and the existence of a trusted and easy-to-use payment solution is required to enable digital trade (World Bank, 2017). Confirming this, JRC (2014) estimate the effect of the quality of logistics services on digital trade activity to be a consistently positive relationship. The paper also confirms a similar effect for payment systems: a higher share of PayPal users induces a positive effect on digital trade activity, while a higher share of cash payments has a negative effect.

- **Traditional regulation and legal**

Traditional legal aspects encompass regulatory factors that are not technology specific, but nonetheless impact digital trade. These range

⁷ The categorisation of these barriers builds on the one presented in an OECD (2018b) paper.

Classifications used in the OECD Digital Services Trade Restrictiveness Index (OECD, 2019d), by the World Bank (2017) and by a JRC research paper (JRC, 2015a) were also taken into consideration.

from unclarified trade regulations and product classifications (OECD, 2018b; Wunsch-Vincent, 2008) to the use of hand-written signatures, paper-based references and forms – which are not compatible with the idea of the digital enterprise (International Chamber of Commerce (ICC), 2016). Furthermore, the lack of a unified consumer protection policy leads to higher perceived risk – even in the EU member states – and could explain why producers are reluctant to offer the same product in all member states (JRC, 2013). Traditional customs, which also affect non-digital trade, can be also listed here as they present an obstacle for firms, many of whom are able to enter international markets because of digitally-enabled trade (USITC, 2014).

- **Specific provisions**

The specific provisions targeted at digital trade and data flows are the narrowest and the most direct set of regulations that impact digital trade activity.

1. Data localisation is one of these provisions and also one of the barriers to digital trade for which estimates of impact are available. The USITC (2014) reported that more than half of surveyed digital communication firms in the US feel localisation is an obstacle to digital trade, with the EU and China stressed as having particularly difficult regulations. A report by ECIPE (2014a) undertook a modelling exercise, the methodology of which is described in ECIPE (2014b). In their method, sectors in the economy bear the cost of data localisation based on their data intensity. Wider economic impacts are modelled using the Global Trade Analysis Project Model (GTAP Model), a Computable General Equilibrium (CGE) macroeconomic model. The paper showed that while data localisation could create some jobs and attract investment from global providers who would like to stay in the country, it would drive out some other providers and most likely drives up the prices of certain infrastructure services (like cloud services) for local firms (ICC, 2016).
2. Currently there is a temporary moratorium on tariffs on data flows agreed by World Trade Organization (WTO) members, which has been extended multiple times, but there is no final decision on content tariffs (E15 Initiative, 2016; Wunsch-Vincent, 2008). However, a more severe regulation, content filtering – letting government-selected content through to the users – is currently in use. The main example of content filtering is in China, but it is prevalent in Egypt, Iran, Pakistan or Russia according to Freedom House; and, worldwide, an estimated 34% of global users face some kind of censorship (Freedom House, 2018). This imposes substantial costs both on providers and users as routing all traffic through government servers can degrade or intentionally slow down services, making cross-border activities unfeasible (USITC 2014; Office of the United States Trade Representative, 2017).

3. As noted by the Office of the United States Trade Representative (2017), multiple EU member states have instituted measures that require aggregation services to remunerate original sources. The new EU-wide Directive on Copyright in the Digital Single Market⁸ that was approved in April 2019 will introduce the same policy through all member states and would bring further regulations. The Directive would make online platforms (such as YouTube or Facebook) liable for copyright infringements (Reynolds, 2019), therefore creating a strong incentive against hosting un-moderated user-generated content. If adopted, the Directive could mean foreign firms leaving the EU market and would mean an increased entry barrier or compliance cost for any firms holding user-generated content (a similar effect to data localisation regulations). Legal liability of internet intermediaries is a particular concern for many digitally active firms in the US (USITC, 2014).

- **Product barriers**

The composition of the average online shopping basket differs significantly from the offline consumer basket; to date, it has been heavily biased towards electronics, clothing, music/film (JRC, 2014). This is most likely because of digital trade's high-margin, non-perishable, easily transportable features and, in the case of music and film, their ability to be delivered digitally lend themselves to e-commerce or digital trade.

A good estimation of the overall extent of these various effects in the context of the EU member states is given by the JRC (2015b). Using survey data collected in 2015, they estimated impacts of most of these barriers on digital trade activity. Overall, the results indicate the impact of barriers in three areas: to participate in digital trade as an exporter, to purchase cross-border and on the volume of trade activity.

The OECD's Digital Services Trade Restrictiveness Index (Digital STRI) is a composite score of the level of restrictions / barriers that traded digital services face, at the country level. It is a well-considered indicator covering many of the topics that we have identified as possible barriers. A consideration of the data relevant to the UK is outlined in Chapter 3.

Measuring the costs, benefits and barriers

The methodologies applied to measure costs, benefits and barriers of digital trade have relied mostly on correlation and macroeconomic modelling techniques. These attempts tend not to use measures of the value of digital trade directly.

A simple approach by The Lisbon Council (2015) proposed a calculation based on the correlations between digital density (measured as data used per capita in the economy), investment in intangible assets, data flows and digital

⁸ Proposal for a Directive of the European Parliament and of the Council on copyright in the Digital Single Market COM/2016/0593 final - 2016/0280 (COD). The proposal was approved by the Council of the European Union on 15 April 2019. At the time of writing it is yet to be published in the Official Journal of the European Union.

trade. A more advanced methodology was used in the study by the McKinsey Global Institute (2016). The authors used a cointegrating econometric estimation on macroeconomic data collected for 139 countries over 1980-2014 to analyse the impacts of digital transformation and increased flows of goods. Similarly, using a version of the GTAP database, the JRC (2015a) studied the economy-level cost reduction effects of digitally enabled trade. Investigating the effects of digital trade in the US, USITC (2014) estimates⁹ indicate real GDP in 2011 was 3.4-4.8% higher than it would have been in the absence of digital trade (with an employment increase of 0.0-2.4m full-time equivalents). The results of these studies suggest substantial positive effects of digitalisation and increasing digital trade. The McKinsey Global Institute (2016) estimated a USD 2.8 trillion GDP increase globally due to data flows in 2014. The JRC (2015a) estimated a 0.14% GDP increase attributed to increased digitalisation of trade and reduced prices in the EU. There are no identified studies that explore similar issues focussing on the UK specifically.

2.3 Development of a practical framework for measuring digital trade: the OECD-WTO-IMF conceptual framework

To be able to assess trends in digital trade, there is a need for a comprehensive and measurable definition of cross-border digital trade. Work conducted by the OECD, WTO and IMF¹⁰ aims to address the knowledge gap by developing a framework that provides practical guidance on defining digital trade based on concepts consistent with National Accounting principles. The framework is a “living” document that will be revised as measurement practices improve. This framework provides a foundation on which methods to compile statistics on digital trade can be based.

The first version of the ‘Handbook on Measuring Digital Trade’ was published on 30th January 2020 (OECD/WTO/IMF, 2020)¹¹.

The OECD framework for the dimensions of digital trade

The OECD framework is structured around three key dimensions of digital trade.

- Nature (How)
- Product (What)
- Actors (Who)

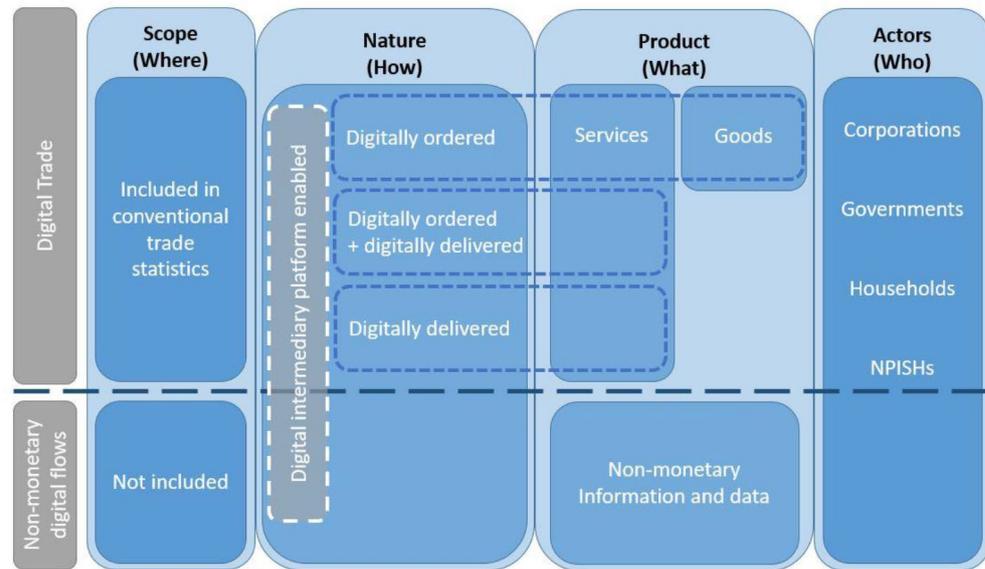
Figure 2-1 outlines the subcategories of each dimension of digital trade.

⁹ A CGE modelling approach with the GTAP database was used to calculate GDP effects, while employment effects were calculated through an econometric modelling exercise using cross-country World Bank data.

¹⁰ The framework is a living document that has been developed by many stakeholders, including the OECD, Eurostat, IMF, UNCTAD, WTO and WCO, but will be hereafter referred to as the OECD framework.

¹¹ The information presented in this report is largely based on a draft (unpublished) version discussed at the [TFITS](#) Expert Group meeting on measuring Digital Trade on 9th October 2019.

Figure 2-1: Dimensions of digital trade



Source: OECD-WTO-IMF Handbook on Measuring Digital Trade Version 1 (OECD/WTO/IMF, 2020).

The framework features a fourth pillar (the “Where”) to make the distinction between concepts of digital trade and “Non-Monetary” digital trade. “Non-Monetary” digital trade is defined by the OECD as digital trade plus flows of information/data that involve no monetary transactions. The importance of considering information/data flows stems partly from the emergence and rapid growth of free digital services to the consumer in recent years. Capturing cross-border information flows poses the biggest measurement challenge, because such flows may not result in the exchange of money, hence, they are invisible in traditional GDP or trade statistics. The discussion that follows is predominantly focussed on the concept of ‘digital trade’.

The “nature” of digital trade transactions

Goods or services that are digitally ordered

Of the three dimensions, the “nature” pillar most explicitly distinguishes the conceptual underpinnings of digital trade from the frameworks used to define traditional trade statistics.

The first component of the nature dimension is “digitally ordered” goods and services. In existing literature, “digital ordering” can be considered as largely synonymous with “e-commerce”, for which a definition – at least at a conceptual level – is relatively refined. The OECD (OECD, 2013) defines e-commerce as:

“The sale or purchase of goods or services conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted online. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organisations. To be included are orders made over the web, extranet or electronic data interchange. The type is defined by the method of placing the order. To be excluded

are orders made by telephone calls, facsimile or manually typed e-mail.”

In the literature reviewed, the concept of e-commerce has generally been understood without reference to whether the concept of *cross-border* e-commerce requires further refinement. This issue arises, in particular, given that any individual transaction can be classed as belonging to multiple aspects of the “nature” pillar (and as such, reflects the overlap in each component in Figure 2-1). This issue is described in further detail in section 2.4.

Services that are digitally delivered

The second component of the nature dimension is digitally delivered transactions. The OECD framework (OECD/WTO/IMF, 2020) defines these as “*international transactions that are delivered remotely in an electronic format, using computer networks specifically designed for the purpose*¹²”, such as services or data flows that are delivered as digital downloads or web-streaming products (e.g. music, films, software, e-books, games). By definition, goods are excluded - digital equivalents of goods such as eBooks or digital software would be considered as the delivery of a license to use the product, and not physical ownership of the product, and are thus considered as digital services rather than digital goods.

ICT services, ICT-enabled services and potentially ICT-enabled services

The definition of digitally delivered services builds on an earlier concept developed by UNCTAD (UNCTAD, 2015) of ICT services, and ICT-enabled services.

ICT services are defined as service activities that are “*intended to enable and/or fulfil the function of information processing and communication*” (p.5, UNCTAD, 2015). Such services are possible to identify in trade in services statistics using the Extended Balance of Payments Services (EBOPS) 2010 classification. According to UNCTAD (UNCTAD, 2015), they are defined as:

- Telecommunications services
- Computer services
- Licenses to reproduce and distribute computer software

ICT-enabled services, on the other hand, are defined as “*services that are delivered remotely over ICT networks*” (p.9, UNCTAD, 2015) and include activities “*that can be specified, performed, delivered, evaluated and consumed electronically*” (p.9, UNCTAD, 2015). Trade in ICT-enabled services therefore essentially covers all service transactions delivered remotely via Mode 1 (cross-border supply) as defined in the General Agreement on Trade in Services (GATS) and the Manual on Statistics of International Trade in Services (United Nations, 2011)¹³.

International trade in services statistics published by most countries typically only capture the types of services traded, not “how” these services are delivered to customers (i.e. the mode of supply). A separate (broader) category - “potentially ICT-enabled services” - was therefore introduced by

¹² As is the case for digital ordering, digitally delivered services can involve participants from all institutional sectors, and cover orders made over the web/internet, extranet or via electronic data interchange but should exclude any services provided by phone, fax or manually typed email.

¹³ A brief introduction to the four modes of supply is available in section 3.2.2 of this report.

UNCTAD to distinguish between those services that *could* be delivered over ICT networks (“potentially ICT-enabled”) and those that *are* actually delivered over ICT networks via Mode 1 (“ICT-enabled services”). ICT-enabled services are a subset of potentially ICT-enabled services.

The definition of these services, based on the EBOPS 2010 classification, is outlined in Table 2-1.

Table 2-1: Potentially ICT-enabled services by EBOPS classification

Category	Sub-categories of services	EBOPS 2010 Codes
ICT Services	1.1 Telecommunications	9.1 Telecommunications services
ICT Services	1.2 Computer services (including computer software)	8.3 Licenses to reproduce and/or distribute computer software 9.2.1 Computer services - Computer software 9.2.2 Computer services - Other computer services
Other Potentially ICT-Enabled Services	1.3 Sales and marketing services, not including trade and leasing services	10.2.2 Advertising; market research; and public opinion polling
Other Potentially ICT-Enabled Services	1.4 Information services	11.1.1 Audio-visual services 11.2.1 Health services 11.2.3 Heritage and recreational services 9.3.1 Information services - News agency services 9.3.2 Information services - Other information services
Other Potentially ICT-Enabled Services	1.5 Insurance and financial services	6.2 Reinsurance 6.3 Auxiliary insurance services 7.1 Financial services 7.2 Financial Intermediation Services Indirectly Measured (FISIM) 6.1.1 Direct insurance 6.4.1 Pension services 6.4.2 Standardized guarantee services
Other Potentially ICT-Enabled Services	1.6 Management, administration, and back office services	10.2.1.1 Legal services 10.2.1.2 Accounting; auditing; bookkeeping; and tax consulting services 10.2.1.3 Business and management consulting and public relations services 10.3.5 Other business services n.i.e.
Other Potentially ICT-Enabled Services	1.7 Licensing services	8.1 Franchises and trademarks licensing fees 8.2 Licenses for the use of outcomes of research and development

Category	Sub-categories of services	EBOPS 2010 Codes
		8.4.1 Licenses to reproduce and/or distribute audio-visual products
		8.4.2 Licenses to reproduce and/or distribute other products
Other Potentially ICT-Enabled Services	1.8 Engineering, related technical services and R&D	10.1.1.1 Provision of customized and non-customized R&D services
		10.1.1.2.1 Patents
		10.1.1.2.2 Copyrights arising from research and development
		10.1.1.2.3 Industrial processes and design
		10.1.1.2.4 Other
		10.1.2 Other research and development services
		10.3.1.1 Architectural services
		10.3.1.2 Engineering services
		10.3.1.3 Scientific and other technical services
		10.3.5 Other business services n.i.e.
Other Potentially ICT-Enabled Services	1.9 Education and training services	11.2.2 Education services

Source: UNCTAD 2015, *International trade in ICT services and ICT-enabled services*.

In 2019, the Office for National Statistics (ONS, 2019a, July 31) published for the first time experimental estimates of UK trade in services delivered via Mode 1 (i.e. delivered remotely). The estimates have been made possible by the addition of a question in the 2019 ONS International Trade in Services (ITIS) survey capturing Mode 1 transactions directly from businesses. Estimates for Mode 2 and 4 have also been published, using approximations and expert judgements based on the simplified Eurostat methodology (Eurostat, 2019e, March 22).

The new modes of supply estimates for the UK provide a direct measure of the value of UK services exports and imports that are actually (as opposed to potentially) digitally-delivered, assuming that remote delivery (Mode 1) broadly corresponds to digital delivery¹⁴. According to the new estimates, remote supply (digitally delivered) services accounted for 67% of total UK services exports and 52% of total UK services imports in 2018 (ONS, 2019a, July 31) – see Chapter 3 for more detail.

¹⁴ In practice, remote delivery (Mode 1) is a broader concept than digital delivery as it includes delivery of services by post or telephone for example.

The OECD framework defines digital trade as trade that is digitally ordered and/or digitally delivered

While e-commerce and EBOPS statistics may serve as useful proxies for measuring digital trade, it is important to emphasise that these measures lack the dimensionality to capture all components of digital trade. Digital trade is not service or good-specific but instead dependent on the nature of the transaction. For example, a measure based exclusively on e-commerce (digital ordering) would exclude many services that are digitally delivered but not necessarily digitally ordered, such as banking services. Similarly, a measure based exclusively on EBOPS statistics (digital delivery) would exclude any goods that are only digitally ordered. Measures based exclusively on either e-commerce or EBOPS would insufficiently capture all aspects of digital trade, hence the need to “marry” these two concepts (ordering and/or delivery) in the definition of digital trade. Digital trade is therefore defined in the OECD framework as trade that is digitally ordered and/or digitally delivered.

Platform-enabled digital transactions are difficult to capture

Another component of the “nature” dimension is transactions facilitated by digital intermediary platforms. Such transactions overlap with (are a subset of) digitally ordered and digitally delivered transactions in that they are essentially either digitally ordered and/or digitally delivered via the intermediary. According to the OECD framework, treating such transactions as a separate component in the “nature” dimension reflects the increasing role they play in the modern economy and the *“conceptual and statistical challenges [they present, requiring dedicated surveys to measure them], especially when [the platforms] are not resident in the country where the intermediation services are consumed”* (p.36; OECD/WTO/IMF, 2020). The distinction also matters in that the component that should be considered digital trade is not the value of the goods or the services passing through the intermediary website, but the (cross-border) intermediation fee charged for facilitating the transaction¹⁵.

The definition of digital intermediaries is not dissimilar to existing literature on multi-sided markets, a term prevalent in assessments of fiscal issues associated with digitalisation (OECD/IMF, 2018). Multi-sided markets are characterised by multiple sellers and consumers and intermediaries, with intermediaries leaving rights and liabilities towards consumers mostly with the supplier (although arguably, the latter property is perhaps subject to debate, as can be observed in the ruling of driver employment rights in the instance of Uber¹⁶). One well-known example is Airbnb, in which consumers interact with multiple “sellers” who advertise their (accommodation) services on Airbnb, Airbnb currently being classified as an intermediary.

While the definition of platform-enabled transactions can be relatively straightforward at the conceptual level (and the prevalence of familiar real-life examples helps this), trying to identify the cross-border component of platform-enabled transactions is much more difficult. The treatment of the intermediated transactions in a digital trade framework is dependent on:

- Location of the intermediary relative to the producer and seller of the intermediated goods or services

¹⁵ Digital trade involving intermediaries may involve other forms of digital trade in addition to the intermediation fee. If the intermediated product also crosses a border between the provider and the consumer, then the value of the product would also be counted as digital trade as it is still digitally ordered.

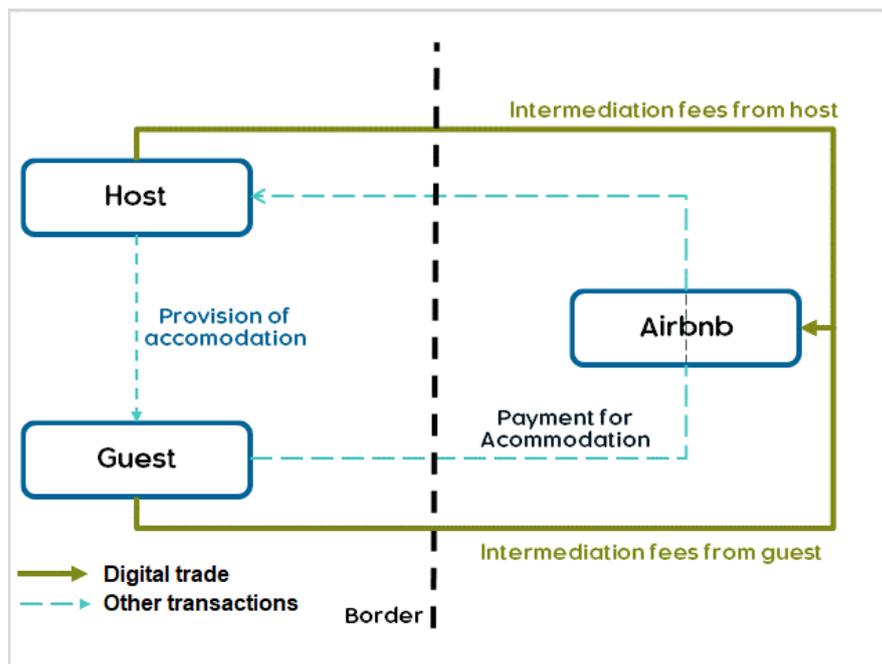
¹⁶ See, for example, Butler (2018).

- Who pays the intermediation fee on the transaction? (Consumer, Producer or both)

These considerations highlight the complexity of intermediaries, and the need to isolate their activities from the suppliers of the products that are purchased/advertised via the intermediary company. Determining the monetary value (intermediation fee charged) of platform-enabled trade compounds the challenge.

The complex nature of platform-enabled digital trade is demonstrated in an applied example. Continuing the Airbnb example in Figure 2-2, a typical transaction would be a guest paying for accommodation hosted on the Airbnb website. That payment is received by Airbnb, and a payment is made from Airbnb to the accommodation's host (the blue dashed line in the figure). Airbnb receives an intermediation fee (the solid green line in the figure), made up of a transaction fee (from the guest) and listing fee (from the host), which is the difference between the money paid by the guest and money received by the host.

Figure 2-2: Stylised Airbnb transaction across a border



Notes: A UK guest pays £100 to book an apartment from a UK host in London via Airbnb which is based in the US. Of that booking, £10 is the transaction fee (10%) paid by the guest. This fee is processed/received by Airbnb. Airbnb also takes a further £3 (3%) fee from the host and then pays the host the remaining £87. The OECD framework recommends that the total transaction fee of £13 should be recorded as a US export to the UK.

Source: Adapted from the OECD Handbook on Measuring Digital Trade (OECD/WTO/IMF, 2020).

There may be other instances of digital trade beyond the simple example outlined in Figure 2-2. Whether there is a cross-border component to the intermediation fee depends on a range of factors, including:

- the ownership of the intermediary (foreign or domestic)

- the location of the intermediate service provider relative to the buyer and seller (foreign or domestic)
- who is paying the intermediation fee (buyer, seller or both)

The interactions of these different factors result in numerous different types of platform-enabled digital trade.

If Airbnb is based abroad and the customer and supplier domestically located, as in the example in Figure 2-2, only the intermediation fee is considered cross-border digital trade because although the payment for the accommodation may flow through the intermediary, its value is attached to the domestically provided services. However, if the consumer is a foreign tourist, then the value of the service itself is digitally ordered from a business in another country and therefore should be considered as digital trade. Furthermore, if the tourist came from the same country as Airbnb, then the tourist part of the intermediation fee would not be digital trade.

Table 2-2 outlines the different combinations of intermediary transactions depending on the factors listed above, as well as how each component of the transaction should be recorded with respect to cross-border digital trade.

Table 2-2: Recording of trade transactions involving digital intermediary platforms

Seller	DIP	Buyer	Treatment of transacted product	Treatment of Intermediation services
<i>If the seller pays the intermediation fee OR if no explicit intermediation fee is charged to the final consumer</i>				
Ctry A	Ctry A	Ctry B	Import by country B from country A	None (domestic transaction)
Ctry A	Ctry B	Ctry B	Import by country B from country A	Import by country A from country B
Ctry A	Ctry B	Ctry A	None (domestic transaction)	Import by country A from country B
Ctry A	Ctry B	Ctry C	Import by country C from country A	Import by country A from country B
<i>If the buyer pays the intermediation fee</i>				
Ctry A	Ctry A	Ctry B	Import by country B from country A	Import by country B from country A
Ctry A	Ctry B	Ctry B	Import by country B from country A	None (domestic transaction)
Ctry A	Ctry B	Ctry A	None (domestic transaction)	Import by country A from country B
Ctry A	Ctry B	Ctry C	Import by country C from country A	Import by country C from country B
<i>If both the seller and the buyer pay an intermediation fee</i>				
Ctry A	Ctry A	Ctry B	Import by country B from country A	Import by country B (of <i>part</i> of the intermediation services) from country A (the remainder of the intermediation services reflect a domestic transaction)
Ctry A	Ctry B	Ctry B	Import by country B from country A	Import by country A (of <i>part</i> of the intermediation services) from country B (the remainder of the intermediation services reflect a domestic transaction)
Ctry A	Ctry B	Ctry A	None (domestic transaction)	Import by country A from country B
Ctry A	Ctry B	Ctry C	Import by country C from country A	Import by country C (of <i>part</i> of the intermediation services) from country B and import by country A (of the remainder of the intermediation services) from country B

Source: OECD/WTO/IMF (2020).

There are further complications to measuring platform-enabled transactions:

- industrial classification of the intermediary (for attributing trade activity to a sector)

- if the intermediary has a domestic affiliate¹⁷ despite being foreign owned (i.e. if Airbnb had a UK affiliate despite being US owned, then an intermediary transaction that appears to be cross-border based on ownership is actually a domestic as it goes through the affiliate instead).

Goods and services of the “products” pillar are conceptually similar to how traditional trade statistics are categorised

Of the three dimensions, the “product” pillar aligns most with methods to classify traditional trade statistics. The first two components of the product pillar – goods and services – align with the classifications that are currently adopted to measure conventional trade. Within these categories, the use of standard and internationally recognised classification systems¹⁸ allows for cohesiveness and comparability across countries and time.

That said, existing classification systems do not by themselves identify the digital component of cross-border trade. As Figure 2-1 highlights, beyond “goods” and “services”, digital trade is defined as how those goods and services are exchanged (the nature of the transactions). Digitally-traded goods are classified as not only ICT goods that are digitally ordered and/or delivered, but also any other goods that are digitally ordered. Similarly, under the broad category of services, a transaction is considered digital trade if the services are digitally ordered and/or digitally delivered.

The interaction of governments, businesses, and consumers is very different for digital trade

Analogous to “goods” and “services” of the products pillar, the “who” dimension covers concepts that feature in trade and National Accounts frameworks: governments, businesses and consumers.

While the actors comprising the “who” dimension in digital trade are familiar, the transactions between them are less so. Buyer-seller relationships are much more multifaceted in digital trade compared to traditional mediums of trade (enabled partly by the relative lower costs of engaging in digital trade). In digital trade, the role of the consumer is no longer restricted to purchasing final goods and services from (third party) retailers, and instead they can interact directly with producers and other consumers.

The OECD framework is a living document that is not yet fully developed

Work on better measuring digital trade is ongoing, and the framework will continue to evolve; there is a need, for example, for further adaptation to account for:

- new types of digital trade, currently posing significant measurement challenges (such as, for example, cryptocurrencies, intellectual property assets, cloud services and intra-firm (parent-affiliate) digital services);
- systematic and practical guidance on collating data to measure digital trade.

These additional complexities are compounded by additional conceptual challenges elaborated in section 2.4 below.

¹⁷ Would be classified as Mode 3 (Commercial Presence) according to GATS. However, this is not captured in the existing trade statistics.

¹⁸ Examples include the Harmonised System (HS) and the Standard International Trade Classification (SITC) for classifying goods, and the Extended Balance of Payments Services (EBOPS) classification.

2.4 Outstanding conceptual and measurement challenges

The OECD framework makes considerable progress to establish a practical and implementable framework to begin measuring the different components of digital trade. In this section we discuss outstanding conceptual challenges associated with measuring digital trade.

Conceptual challenges associated with cross-border digital trade

One of the key issues associated with the framework is that observed transactions cannot be exclusively mapped to distinct components within the pillars, and as such, there may be additional ambiguity as to what comprises cross-border and what does not. For example, if a digitally ordered service from a foreign company is fulfilled by a domestic provider, it is very difficult to identify and isolate the exact components which constitute “digital trade” based on identified transactions.

Even in a simple cross-border transaction, the component that should be considered as digital trade might not be straightforward. For example, consider that a consumer in the UK purchases a book online from a Canadian retailer. The book is digitally ordered but physically delivered. Here, the flow is recorded as a UK import from Canada, equal to the whole value of the book purchased. But, which component of this transaction should be considered digital trade? Should the whole value of that transaction be considered digital or just its digital component? There are no definitive answers, which outlines the complexity of classifying trade as digital.

One starting point might be to measure monetary transactions in gross terms (including cross-border, non-digital transactions), and from this, try to identify the “net” component attributable to digital trade. In the OECD framework, this issue is considered explicitly for digital intermediaries with the recommendation that only a net measure of transactions is needed for evaluating cross-border digital trade.

A figure from the OECD framework (copied here for reference, as Figure 2-3) underlines the issue of how each pillar and each component within each pillar are often not-mutually exclusive.

Figure 2-3: Examples of digital trade transactions

What	How			Who	Description	Transaction example
	Digitally ordered	Platform enabled	Digitally Delivered			
Good	Y	N	N	B2B	An enterprise in country A purchases a good directly from a supplier in country B.	A firm purchases a component used in its production via its EDI.
Good	Y	N	N	B2C	A consumer in country A purchases a good (for final consumption) directly from a supplier in country B.	A consumer purchases an article of clothing from a company's webshop.
Good	Y	Y	N	B2B	An enterprise in country A purchases a good from a supplier in country B via an online platform located in country A, country B or C.	A firm orders office furniture from another firm via eBay.
Good	Y	Y	N	B2C	A consumer in country A purchases a good (for final consumption) from a supplier in country B via an online platform located in country A, country B or C.	A consumer orders a physical book on Amazon.
Good	Y	Y	N	C2C	A consumer in country A purchases a good (for final consumption) from another consumer in country B via an online platform located in country A, B or C.	A consumer purchases second-hand goods via eBay.
Service	Y	N	N	B2B	An enterprise in country A purchases a service online directly from a supplier in country B, and the service is delivered physically.	A firm purchases a transportation service from another firm via a website.
Service	Y	N	N	B2C	A consumer in country A purchases a service online directly from a supplier in country B, and the service is delivered physically.	A tourist purchases a hotel stay via the hotel's website.
Service	Y	Y	N	B2B	An enterprise in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered physically.	A firm purchases standardised maintenance or repair services.
Service	Y	Y	N	B2C	A consumer in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered physically.	A tourist orders a transportation service through Uber.
Service	Y	Y	N	C2C	A consumer in country A purchases a service from another consumer in country B via an online platform located in country A, B or C, and the service is delivered physically.	A tourist purchases accommodation services via AirBnB.
Service	Y	N	Y	B2B	An enterprise in country A purchases a service online directly from a supplier in country B, and the service is delivered digitally.	A firm purchases standardised computer services.
Service	Y	N	Y	B2C	A consumer in country A purchases a service online directly from a supplier in country B, and the service is delivered digitally.	A consumer purchases a life insurance policy.
Service	Y	Y	Y	B2B	An enterprise in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered digitally.	A firm orders a logo design from a graphical design firm via a platform for graphical designers.
Service	Y	Y	Y	B2C	A consumer in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered digitally.	A firm subscribes to a music streaming service.
Service	Y	Y	Y	C2C	A consumer in country A purchases a service from a consumer in country B via an online platform located in country A, B or C, and the service is delivered digitally.	A consumer orders a knitting pattern from another consumer via Ravelry.

Source: OECD/WTO/IMF (2020).

This overlapping classification of transactions has considerable implications when it comes to developing measures of digital trade, because if data are collated for each dimension individually (e.g. digitally ordered and digitally delivered) then summing the two to provide an estimate of total digital trade would result in double-counting transactions that are both digitally ordered and digitally delivered. It is for the same reason that it would be beneficial for

statistics that measure digital transactions (such as e-commerce) to account for and differentiate between products that are digitally ordered, digitally delivered or both (this is discussed further in Chapters 3 and 4).

There are challenges in identifying where the operations of multinational firms are based for cross-border purposes

The scope of digital trade is also further complicated by multinational enterprises. Though not unique to digital trade, many of the dominant digital intermediaries are multinational enterprises. The distinction between foreign-based and foreign-owned becomes important to determining if an intermediary's service is cross-border. For example, if Airbnb has established a local entity in the UK even though it is headquartered in the United States, then if cross-border reflects where the operations are based and not where the firm is owned, then only Airbnb UK's transaction fee from guests outside of the UK would constitute digital trade.

Measurement challenges associated with cross-border digital trade

Beyond the conceptual challenges, there are a number of practical challenges with measuring digital trade, including how it might be possible to account for implicit price changes in digital products from a change in quality (though this issue is not unique to digital trade), or the difficulties with identifying the value of intermediation services separate from the value of the goods or services intermediated. There are also sizeable measurement challenges associated with the recording of de minimis trade (low value but high volume parcel trade below customs thresholds) and the measurement of household imports of digital downloads and streaming services (e-books, films, games etc) which are difficult to capture in official trade data. Further explorations of these measurement challenges are available in Chapters 3 and 4.

2.5 Concluding remarks

A clear definition of digital trade has been slow to emerge despite its growing importance

Despite the growing importance of digital trade in recent years, until recently, there had been very little work done to clearly define and measure digital trade. Without a clear and systematic way to define digital trade, reliable and internationally comparable measures of digital trade have been lacking. As a result, policymakers are currently unable to assess the scale of, or trends in, digital trade (and correspondingly, the cost and benefits of digital trade) and thus unable to correctly account for digital trade in future policy decisions.

Even with a clear and comprehensive definition of digital trade, the statistics on digital transactions will need to be improved. Conventional trade statistics do not capture all the necessary details on digital transactions required to assess digital trade.

The literature on the benefits, costs and potential barriers is largely theoretical

Despite the lack of a universally agreed definition, there is a considerable body of research on the benefits, costs and potential barriers surrounding digital trade. However, the research is largely theoretical, and empirical work to quantify the costs, benefits or barriers is scarce, perhaps because there are currently no accurate or comprehensive measures of digital trade.

Most of the individual benefits analysed are rooted in the cost reduction effect of digital connectivity, with reductions in distance costs as the main driver. On the other hand, costs are of a different nature: costs related to regulatory regimes and compliance are deemed to be the largest, while there are similar, but less severe costs related to cultural differences (previously largely hidden in geographical distance).

The case is similar for barriers to digital trade. Quantified results for individual barriers are rare in the literature, but there are multiple indices with the goal of measuring “readiness” or trade restrictions imposed on actors (such as the OECD’s Digital STRI). These indices often emphasise the impact of infrastructure and digital connectivity as enablers of digital trade.

The OECD framework provides a good basis for defining digital trade

Conventional trade statistics and classifications do not align neatly with digital trade, given the properties and characteristics of digital trade. The OECD framework provides a good starting point for a comprehensive conceptual understanding of what constitutes digital trade by identifying the dimensions across which to assess digital trade transactions.

Understanding the “nature” of the transaction is essential for digital trade

The OECD framework characterises digital trade into three key pillars: product (what), actors (who) and nature (how) of the transaction. Both product and actors align well with conventional statistics (though the relationship between actors is quite different from conventional trade). What really advances the conceptual understanding of digital trade is the focus on the nature of the transaction (i.e. is the item digitally ordered, digitally delivered, or both?) rather than the nature of the product that is traded.

Intermediaries present additional complexity

The nature of digital trade is made more complex due to the existence of platform-enabled intermediaries which overlap with the concepts of digitally ordered and digitally delivered. Evaluating trade from intermediaries requires careful consideration about the location of the intermediary in relation to the seller and the consumer, and how the intermediation service is paid for and by whom and whether that intermediation fee crosses a border. The OECD framework outlines the basic principles, but beyond that, there are measurement challenges to isolating the value of the intermediation fee.

There are still conceptual challenges to be addressed to ensure a complete evaluation of digital trade

There are outstanding conceptual challenges regarding the application of the framework for measuring digital trade. One example is in what instances digital transactions should be considered cross-border for multinational enterprises. There is also an issue of the nature of digital trade transactions overlapping, especially between digitally ordered and digitally delivered.

These issues become more critical when considering the compilation of statistics to measure digital trade. The current availability of data and gaps present in those sources will be discussed in detail in the following chapter.

3 Towards measuring UK digital trade

Key Points

- Reliable and internationally comparable statistics on cross-border digital trade that are coherent with National Accounts frameworks are limited. Existing statistics capture some but not all aspects of cross-border digital trade.
- A major shortcoming of all the identified, relevant, data sources on cross-border e-commerce (an important component of digital trade) is that they do not explicitly capture the value of e-commerce transactions and do not distinguish between domestic and cross-border trade. In the limited cases where a distinction is made, the estimates lack information on the monetary value or the role of intermediary platforms in the transaction. There is also limited information available by type of product traded, trading partner and the nature of the transaction (whether products are digitally ordered and/or delivered via for example a website or intermediary platform).
- Even so, the data sources provide some insight into digital trade activity:
 - Digitally-ordered (e-commerce)

In 2017, 8% of UK businesses received an order placed via a website or app from overseas customers (EU and Non-EU). This is slightly higher than the EU average of 7%¹⁹. In 2018, 7.5% of UK businesses with 10 or more employees made website sales to EU countries (up from 6.2% in 2010) and 5.7% made web sales to Non-EU countries (up from 5.0% in 2010)²⁰. In 2019, 33% of adults (aged 16+) in Great Britain reported that they purchased goods and services online from sellers in the EU (up from 15% in 2010), and 39% made purchases from Non-EU sellers (up from 18% in 2010)²¹.
 - Digitally-delivered (potentially ICT-enabled) services

Trade in “potentially ICT-enabled” services is very important for the UK. In 2018, the UK exported £221bn (74% of total services exports) and imported £107bn (55% of total services imports) in potentially-ICT enabled services, resulting in a trade surplus of £114bn. The UK surplus in these services has increased in nominal terms more than four-fold over 1997-2018, driven by robust growth in exports of financial and business services.²²
- Experimental data published for the first time in July 2019 by the ONS provide a direct measure of UK trade in services that are actually, as opposed to potentially, delivered digitally²³. Excluding Mode 3, the data indicate that £190bn (67%) of all UK services exports and £91bn (52%) of all UK services imports were supplied digitally in 2018.

¹⁹ Eurostat (2019b).

²⁰ ONS (2019g, November 29).

²¹ ONS (2019a, August 12).

²² Cambridge Econometrics calculations based on ONS EBOPS data from the 2019 Pink Book (ONS, 2019f, October 31).

²³ Assuming that remote delivery broadly corresponds to digital delivery.

3.1 Introduction

Data on cross-border digital trade are severely limited

Reliable and internationally-comparable official statistics covering all (or any) aspects of cross-border digital trade are limited in their availability and, especially for the UK, the available data are not comprehensive. There have been several stock-taking exercises aimed at understanding the current state of digital trade statistics (OECD, 2017; OECD, 2019a; OECD, 2019b; OECD/IMF, 2017). These exercises have indicated that although countries (including the UK) have made good progress in developing digital trade statistics in some areas, important gaps and measurement challenges still exist. It was found that although limited data do exist, the data typically fail to capture important aspects of digital trade such as the value of digital trade, the cross-border dimension, the location of buyers and sellers, the role of intermediary platforms, and the type of products traded.

Existing statistics fail to capture a key defining feature of digital trade

Conventional approaches for measuring digital trade/economy rely on identifying products that are considered “digital” and mapping them to the industries (using the Standard Industrial Classification (SIC) codes) in which they are principally produced. While such approaches are clear in their definition of what is and what is not “digital”, they potentially omit parts of digital trade.

In theory, firms in any sector can engage in digital trade. For example, a shoe manufacturer selling online to someone abroad should be captured as a digital trade transaction. However, approaches to define digital trade activity using SIC classifications may not consider the shoe manufacturing sector as “digital” (see the Core and Narrow definitions discussed in section 2.2, for example). In its Handbook, the OECD notes that, while useful, “*conventional measurement approaches that typically look at groupings of products and/or industries... struggle, on their own, to provide a holistic notion of digital trade i.e. one that reveals the contribution of digitalisation to trade*” (p.19-20, OECD/WTO/IMF, 2020). As noted in Chapter 2, the key defining characteristic of digital trade is the nature of the transaction – whether a product is digitally ordered or delivered.

What follows in section 3.2 is a discussion of the available official UK data in the domain. Data on both digitally ordered and digitally delivered transactions are considered, and the gaps and weaknesses associated with these datasets and methods are discussed. Section 3.3 provides a brief consideration of data on barriers to digital trade and section 3.4 summarises the outstanding measurement challenges given the available data. It should be noted that the discussion focuses on official data sources and statistics. Commercial data sources are not considered.

3.2 UK digital trade: the available data sources

Existing statistics implicitly capture the value of digital trade

There are few official data sources that present reliable estimates of digital trade transactions. A major shortcoming of existing trade statistics is that they do not explicitly capture the value of digital trade. Instead, the value of digital trade is only implicitly included in estimates of services and goods trade. Sources that do attempt to directly capture digital trade activity, such as the ONS e-commerce statistics, typically do not distinguish between domestic and cross-border transactions. In the limited cases where a distinction is made, the estimates do not provide information on the monetary value of the transaction

or detail about important characteristics of digital trade activity, such as the type of products traded, the location of traders and consumers, the role of digital intermediaries, and the type of transactions (digitally ordered, delivered or both).

As a result, official data sources provide very limited information to identify explicitly the different transactions that encompass digital trade activity within the OECD-WTO-IMF framework. The following official data sources represent the most relevant data sources for measuring cross-border digital transactions in the UK:

ONS, DCMS, and Eurostat publish some data on cross-border digital transactions in the UK

- E-commerce and ICT activity (published by the ONS);
- E-commerce Sales and Purchases (published by Eurostat, based on ONS e-commerce data);
- Internet access – households and individuals (published by the ONS);
- Estimates of potentially ICT-enabled (or digitally delivered) services - Cambridge Econometrics estimates based on methods developed by UNCTAD and ONS Balance of Payments (EBOPS) data;
- Estimates of actually ICT-enabled services – published by the ONS. Derived from an additional question included in the ONS ITIS survey in 2019 asking businesses to provide an estimate of the proportion of services they traded remotely (Mode 1);
- Department for Digital, Culture, Media and Sports (DCMS) sectors economic estimates (published by the DCMS).

In what follows, we present estimates covering specific aspects of digital trade in the UK. Section 3.2.1 provides estimates of UK cross-border e-commerce trade, based on ONS surveys of businesses (section 3.2.1.1) and households/individuals (section 3.2.1.2). Section 3.2.2 presents first estimates for the UK of potentially digitally-delivered services (based on the UNCTAD methodology and ONS Balance of Payments data) and actually digitally delivered services (based on experimental data on modes of supply published recently by the ONS). Finally, section 3.2.3 discusses estimates relevant to digital trade compiled by the DCMS.

3.2.1 Digitally ordered (e-commerce) transactions

ONS E-commerce and ICT activity

Section 3.2.1.1 presents estimates of cross-border e-commerce, derived from ONS surveys of businesses. These surveys capture e-sales (exports) by UK businesses to businesses and consumers overseas (B2B and B2C). Estimates on e-purchases (imports) are also available but limited.

Section 3.2.1.2 considers estimates derived from ONS household surveys – these only capture e-purchases (imports) of UK residents from foreign businesses and individuals (B2C and C2C).

Estimates derived from these surveys are published by both the ONS and Eurostat. A discussion of the data and indicators available from Eurostat, and how these differ from those published by the ONS, is included.

3.2.1.1 Cross-border e-commerce statistics based on business surveys

The “E-commerce and ICT activity” statistics published by the ONS contain data on the use of ICT and the value of total (domestic and cross-border) e-commerce activity. The survey was developed in response to a regulation passed in 2004 for gathering statistics on digital economic activity. The questions asked and frequency of surveys are determined by Eurostat regulation. The coverage of the dataset is summarised in Table 3-1.

Table 3-1: Coverage of the E-commerce and ICT activity (ONS) dataset

	All businesses (including micro-businesses with less than 10 employees)	Businesses with at least 10 employees
Time period covered	2014-18	2009-18
Sample size	7,700	7,700
Geography	United Kingdom	United Kingdom
Type of survey/mode	Business survey conducted annually, sample-based survey, mandatory (statutory requirement)	Business survey conducted annually, sample-based survey, mandatory (statutory requirement)
Discontinuities in the data	<p>Data on “micro-businesses” (businesses with less than 10 employees) available for 2014-18</p> <p>Data on businesses with at least 10 employees available for 2009-18</p> <p>Data on UK business sales (as a proportion of total sales) by geographical area and sector available for every other year (2010, 2012, 2014, 2016 and 2018)</p> <p>Change in the data collection method in the 2018 survey, from a paper to an electronic questionnaire, introduced a discontinuity in the results for businesses with 0-9 employees and, therefore, all businesses</p>	<p>Data on businesses with at least 10 employees available for 2009-18</p> <p>Data on UK business sales (as a proportion of total sales) by geographical area and sector available for every other year (2010, 2012, 2014, 2016 and 2018)</p>
Sector detail	<p>Manufacturing (Division 10 to 33)</p> <p>Utilities (Division 35 to 39)</p> <p>Construction (Division 41 to 43)</p> <p>Wholesale and Retail (Division 45 to 47)</p> <p>Transport and storage (Division 49 to 53)</p> <p>Accommodation and food services (Division 55 to 56)</p> <p>Information and communication (Division 58 to 63)</p> <p>Other services (Division 68 to 74, 77 to 82 and 95.1)</p>	<p>Manufacturing (Division 10 to 33)</p> <p>Utilities (Division 35 to 39)</p> <p>Construction (Division 41 to 43)</p> <p>Wholesale and Retail (Division 45 to 47)</p> <p>Transport and storage (Division 49 to 53)</p> <p>Accommodation and food services (Division 55 to 56)</p> <p>Information and communication (Division 58 to 63)</p> <p>Other services (Division 68 to 74, 77 to 82 and 95.1)</p>

	All businesses (including micro-businesses with less than 10 employees)	Businesses with at least 10 employees
Business size categories	0 to 9 employees	10 to 49 employees
Business size categories	10 to 49 employees	50 to 249 employees
Business size categories	50 to 249 employees	250 to 999 employees
Business size categories	250 to 999 employees	1000 or more employees
Business size categories	1000 or more employees	
Indicators available in the dataset	Sales over website	Sales over website
Indicators available in the dataset	Sales over EDI (Electronic Data Interchange)	Sales over EDI (Electronic Data Interchange)
Indicators available in the dataset	Total e-commerce sales	Total e-commerce sales

Source: ONS (2019g, November 29).

Data for total e-commerce (domestic and cross-border) are available for the UK from 2009 to 2018 (covering businesses with more than 10 employees), with a shorter time series (2014-2018) available for all businesses including less than 10 employees.

E-commerce and ICT statistics are drawn from a large and high-quality dataset

The quality of the estimates for total e-commerce activity is good, drawn from an annual, mandatory sample-based survey. However, the survey includes only a limited number of estimates relating to cross border e-commerce. The questions are only included in the survey every two years, according to Eurostat requirements. The latest available results on cross-border e-commerce were published in 2019, in relation to the 2018 year.

The statistics suffer from a number of limitations, including that only the proportion of UK businesses making sales abroad is captured

Although information on the proportion of UK businesses making website sales by geographical area and industry is included, the geographical disaggregation is limited to the UK, the EU27 and the rest of the world, and the industry detail is limited. More importantly, the monetary value of the trade is not available.

Other limitations of the dataset include limited available information on imports and on the types of products (goods or services) ordered online. Although the annual ONS questionnaire elicits information on both online sales (exports) and online purchases (imports) by UK businesses, information on imports is not always published in ONS statistical releases but is shared with and published by Eurostat (see “Eurostat e-commerce data” section below).

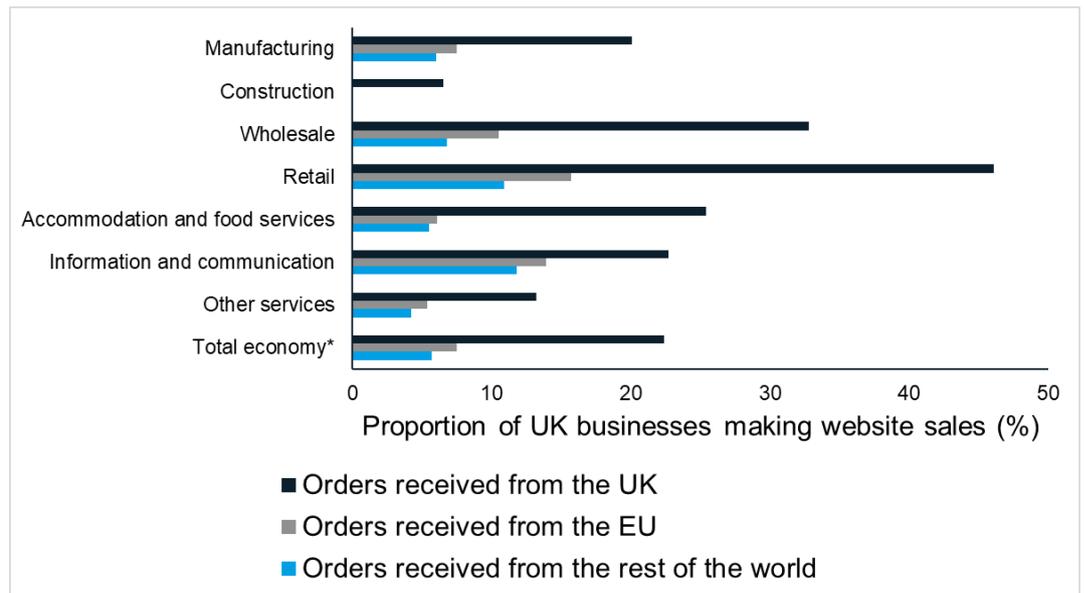
The data indicate that an increasing proportion of UK businesses have been making overseas sales via websites since 2010:

- The share of UK businesses with 10 or more employees making website sales to EU countries increased from 6.2% in 2010 to 7.5% in 2018.
- Over the same period, the share of UK businesses with 10 or more employees making website sales to Non-EU countries increased from 5.0% to 5.7%.
- At the same time, the share of businesses with 10 or more employees making EDI sales to the EU or to the Non-EU has decreased.
- In 2018, the sector with the highest proportion of UK businesses with 10 or more employees making website sales to EU countries was Retail

(15.7%). Retail also had the highest proportion of UK businesses making website sales to the rest of the world (10.9%).

The data presented in Figure 3-1 capture the proportion of UK businesses engaged in exports via e-commerce (both business to business – B2B – and business to consumer – B2C), but not the value of the exports, or specific destination countries. The same measures, including (limited) data on imports, are available from Eurostat based on the same underpinning survey data.

Figure 3-1: Share of UK businesses making website sales by geographical area, 2018



Notes: All data for businesses with 10 or more employees.
 *Total Economy excludes Agriculture (SIC Section A), Mining and Quarrying (Section B), Utilities (Divisions 35-39), Transport and Storage (Divisions 49-53), Veterinary activities (Division 75) and Government services (Section O-S except SIC 95.1).

Source: ONS (2019g, November 29).

Eurostat e-commerce data

The ONS estimates presented above feed into the E-commerce Sales and Purchases statistics published by Eurostat. The data published by Eurostat are helpful for putting the UK’s e-commerce export and import activity in the context of other EU member states and selected countries since all member states are required to ask the same questions at the same level of frequency.

Eurostat data are not entirely comparable internationally

Despite this legal requirement, the Eurostat data are not entirely comparable internationally due to the adoption of different data collection and estimation methodologies and cases of missing data due to different reporting timelines across member states²⁴. Table 3-2 summarises the indicators and their geographical coverage, included in the Eurostat data.

²⁴ Eurostat e-commerce statistics report data for the EU member states plus Iceland, Norway, Montenegro, North Macedonia, Serbia, and Turkey, albeit with missing observations.

Table 3-2: Coverage of the Eurostat e-commerce dataset

	Dataset coverage
Time period covered	2009-17 (<i>back-casted data available over 2003-2008</i>)
Sample size	Variation between member states in number of businesses surveyed. Detailed information is available in country-specific notes (see Eurostat, 2019a, March 14).
Geography	EU member states, Iceland and Norway, EU member candidate countries and potential EU member candidate countries. In some cases, data for the United States, Canada, Japan, Australia, and Korea have also been made available by the OECD, but data for these regions are not validated by Eurostat.
Type of survey/mode	Similar survey methods with some difference in sample and statistical methods across countries (more information available in country specific notes (Eurostat, 2019a, March 14)).
Units	For all indicators, “enterprise” refers to all non-financial sector enterprises with 10 or more employees.
Discontinuities in the data	<p>For some indicators, there are some instances of missing data for some regions – this is because there are not consistent schedules for collecting and processing the data and providing it to Eurostat across all reporting states.</p> <p>Estimates are not calculated for aggregate categories for all indicators (i.e.: indicators sometimes unavailable for EU-15, EU-27, EU-28).</p>
Indicators available in the dataset	<p>E-Commerce Sales:</p> <p>Percentage of enterprises:</p> <ul style="list-style-type: none"> with web sales to own country with web sales to other EU countries with web sales to the rest of the world having done electronic sales to own country having done electronic sales to other EU countries having done electronic sales to the rest of the world having done electronic sales to other EU countries and the rest of the world having done electronic sales or purchases to their own country having done electronic sales or purchases to other EU countries having done electronic sales or purchases to the rest of the world that received orders placed via a website or apps from customers in foreign countries (EU or rest of

	Dataset coverage
Indicators available in the dataset	the world)
	E-Commerce Purchases:
	Percentage of enterprises:
	purchased via computer networks from suppliers located in their own country
	purchased via computer networks from suppliers located in other EU countries
purchased via computer networks from suppliers located in the rest of the world	
	purchased online from suppliers located in other EU countries and the rest of the world

Source: Eurostat (2019b).

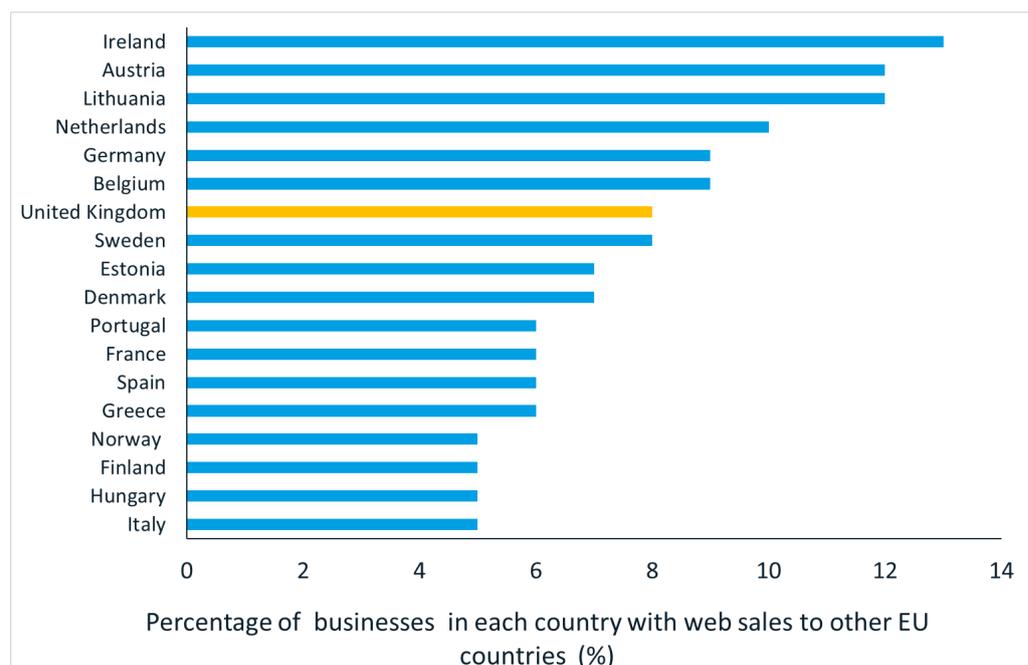
Data are available on online cross-border sales (exports) and purchases (imports)

Unlike the ONS release which only publishes information on online cross-border sales (exports), the Eurostat datasets also feature information on online cross-border purchases (imports), although the import data for the UK are currently limited to 2011 only.

Numerous metrics on business exporting activity are available from Eurostat, with 2017 being the latest year for which data are available. The results below cover businesses with 10 or more employees in all sectors, excluding the financial sector:

- In 2017, 8% of UK businesses reported web sales to customers in other EU members, this is 1 pp higher than the EU average of 7% - see Figure 3-2.

Figure 3-2: Percentage of businesses in each country with web sales to EU countries (excl. domestic sales) (2017)



Notes: All enterprises with 10 or more employees, excluding the financial sector.
Source: Eurostat (2019b).

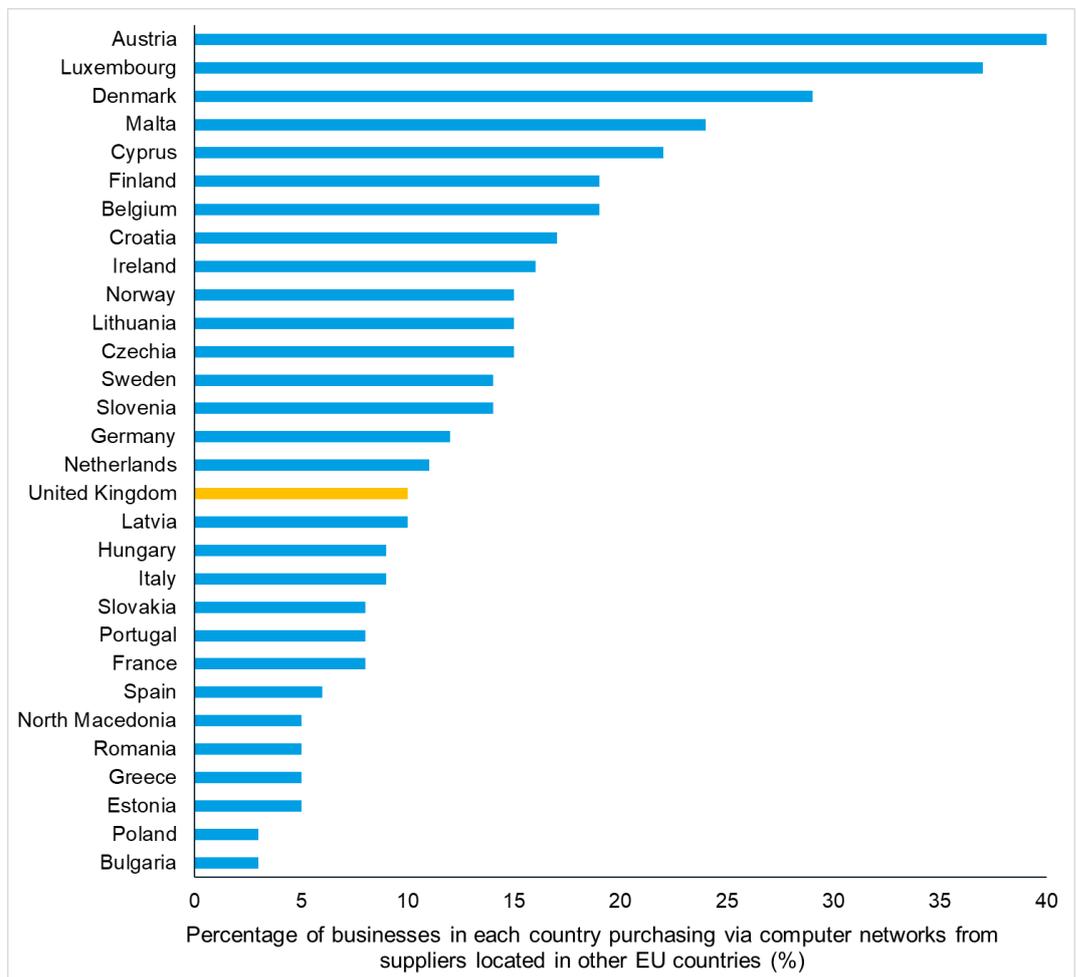
- In 2017, 7% of UK businesses reported web sales to customers in Non-EU countries - this is 2 pp higher than the EU average of 5%.
- In 2017, 8% of UK businesses received an order placed via a website or app from overseas customers (EU and Non-EU). This is slightly higher than the EU average of 7%.

UK businesses' e-commerce purchases (import) data are missing for all years save for 2011

Although data on businesses' e-commerce purchases (imports) are available in the Eurostat dataset, these do not include the UK in the most recent years. UK data are missing for all years apart from 2011. The estimates below are for 2011 and cover all UK businesses with 10 or more employees, excluding the financial sector:

- 10% of UK businesses reported purchasing via computer networks from suppliers located in other EU countries - see Figure 3-3.
- 7% of UK businesses reported purchasing via computer networks from suppliers located in the rest of the world, higher than the EU average of 5%.
- 6% of UK businesses reported purchasing online from suppliers located abroad (i.e. in other EU countries and the rest of the world), higher than the EU average of 4%

Figure 3-3: Percentage of businesses in each country with web purchases from suppliers located in other EU countries (2011)



Notes: All enterprises with 10 or more employees excluding financial sector.
Source: Eurostat (2019c).

3.2.1.2 Cross-border e-commerce statistics based on surveys of households and individuals

ONS Internet Access – Households and Individuals

The “ONS Great Britain: Internet Access – Households and Individuals” release (ONS, 2019d, August 12) is another publication with information relevant to cross-border e-commerce. The data are collected from the annual Opinions and Lifestyle Survey, a multi-purpose household survey covering a variety of topics deemed to be too brief or limited in scope to warrant surveys on their own. Included in the Opinions and Lifestyle survey is the Internet Access Survey module, which includes questions on household e-commerce activity. The coverage of the data is summarised in Table 3-3.

Table 3-3: Coverage of ONS Internet Access - Households and Individuals survey

	Dataset coverage
Time period covered	2006-19
Sample size	900 individuals (aged 16+), on average, per month for three months.
Geography	Great Britain
Type of survey/mode	Household survey, sample-based survey, voluntary
Discontinuities in the data	Until 2010, the survey was designed to cover the UK. From 2011, the coverage was reduced to Great Britain only. <i>“This had minimal impact on the published results because most of the published estimates relate to the current period. Where estimates for previous years are published they have been adjusted to be on a Great Britain basis”</i> (ONS, 2019c, August 8).
Age groups	16-24 25-34 35-44 45-54 55-64 65-74 75+
Disability groups	2011-2013 DDA disabled Work-limiting disability only No disability 2014-2019 Equality act disabled Not equality act disabled
Indicators available in the dataset	Share of households with internet, internet connection type (<i>households identified via individuals – adjusted using individual and household weightings</i>) Frequency of internet use Devices used to access the internet Internet activity Frequency and type of online shopping by 14 broad product categories:

	Dataset coverage
Indicators available in the dataset	<ul style="list-style-type: none"> Clothes or sports goods Household goods (e.g. furniture, toys, vehicles etc.) Holiday accommodation Tickets for events Travel arrangements (e.g. Transport tickets, car hire) Films, music (including downloads) Books, magazines, newspapers (including e-books and downloads) Food or groceries Electronic equipment (including cameras) Video games software, other computer software and upgrades (including downloads) Telecommunication services Computer hardware Medicine E-learning material Total value of online purchases Location of sellers of goods or services purchased online Financial activities carried out online Smartphone security Use of computers at work, working from home

Source: ONS (2019c, August 8).

Data are available on the proportion of B2C and C2C cross-border e-commerce transactions

This dataset captures the proportion of adults (aged 16+) that have made purchases online by type of product purchased, as well as the frequency of e-commerce activity by a range of demographic characteristics.

However, as with the e-commerce business survey, the survey does not capture information on the *value* of imports. The available indicators that provide some indication of monetary value relate only to the proportion of households making total (domestic *and* cross-border) e-commerce purchases by price bracket (e.g. less than £50, £50-£99, £100-£499 etc.).

Furthermore, there is limited information on the country of origin of these imports. The geographical disaggregation available is limited to the UK, the EU, the rest of the world, and an “unknown” category. In addition, the survey only captures the proportions of adults buying goods and services online from these geographical locations, and not the value of these purchases.

ONS Internet access data are from a voluntary household-based survey with a relatively small sample size

Another important shortcoming of household-based surveys is that they assume that respondents are aware of the country of origin of their purchases. In practice, individuals may struggle to accurately identify if they engage in a cross-border transaction, a problem that is compounded by the fact that many online transactions are often intermediated by third parties. This, together with the voluntary nature of the survey and the relatively small sample sizes, mean that results should be treated with caution. However, some insights relevant to e-commerce trade can be obtained from the dataset (ONS, 2019d, August 12):

- In 2019, 33% of adults (aged 16+) in Great Britain who had purchased goods and services online identified the sellers they had purchased from as being from another EU country.

- In 2019, 39% of adults (aged 16+) in Great Britain who had purchased online identified the sellers they had purchased from as being located outside the EU.
- In 2019, 13% of adults (aged 16+) in Great Britain who had purchased online were unsure of the origin of some online sellers.
- The share of adults (aged 16+) in Great Britain who had purchased goods and services online from other EU countries more than doubled between 2008 and 2019, from 12% to 33%. The share of adults who made online purchases from Non-EU sellers also increased markedly over the same period, from 18% in 2008 to 39% in 2019.

The 2017 ONS release contains additional estimates by type of goods/services purchased online broken down by demographic characteristics such as age-group, sex and disability (ONS, 2017c, August 3). However, there are no breakdowns by the location of sellers.

The estimates from the 2017 ONS release show that:

- 27% of adults (aged 16+) in Great Britain bought or ordered physical goods from online sellers outside the UK in 2017
- 15% of adults (16+) in Great Britain bought or ordered travel and accommodation services from online sellers outside the UK in 2017
- 10% of adults (16+) in Great Britain bought e-products that were downloaded or accessed from websites or apps (e.g. films, music, e-books, e-newspapers, games) from online sellers outside the UK in 2017

Table 3-4 below, reproduced from the ONS Internet Access – Households and Individuals dataset, summarises the results from this extra question.

Table 3-4: Products bought or ordered over the internet outside the UK, by age group, sex and disability status, 2017

	Within the last 12 months										%	
	Age group						Sex		Equality Act disabled ¹	Not Equality Act disabled		All
	16-24	25-34	35-44	45-54	55-64	65+	Men	Women				
Physical goods (eg Electronics, clothes, toys, food, groceries, books, CDs/DVDs)	35	37	33	32	21	12	30	24	20	30	27	
Travel, accommodation or holiday arrangements (eg tickets and documents by mail or printed by yourself)	14	18	20	18	15	6	19	11	7	17	15	
Products downloaded or accessed from websites or 'apps' (eg films, music, e-books, e-newspapers, games, paid 'apps')	16	11	15	9	9	5	15	6	7	11	10	
Other services (eg tickets for events received via mail, telecom subscriptions)	6	6	7	10	6	3	8	4	2	7	6	

Notes: Based on adults (aged 16+) in Great Britain, Equality Act disabled refers to those who have a health condition or illness in line with the Equality Act definition of disability.

Source: ONS (2017c, August 3).

The value of household cross-border online purchases is not captured

In sum, the data provide insights into the types of goods and services UK consumers purchase online and the general regions from which consumers buy online. In addition, the dataset can provide some insights on the demographic groups that are more likely to purchase goods or services online. However, none of the statistics readily enables an estimate of the value of household e-commerce transactions that is cross-border.

Eurostat Internet Access Data

Similar data on individual and household e-commerce activity are available from Eurostat (see Table 3-5).

Table 3-5: Eurostat ICT usage in households and by individuals

	Dataset coverage
Time period covered	2003-18
Sample size	Variation between member states in number of individuals and households surveyed, detailed information available in the country specific notes section ²⁵ .
Geography	EU-Member states, Candidate countries, Iceland and Norway, and some EU aggregates. For some indicators data from other countries are available but this is presented without validation by Eurostat.
Type of survey/mode	Similar survey methods with some difference in sample and statistical methods across countries (more information available in country specific notes (Eurostat. 2019d))
Discontinuities in data	For some indicators, there are some instances of missing data for some regions – this is because there are not harmonised schedules for collecting and processing the data and providing it to Eurostat across all reporting states
Indicators available in dataset	<p>Internet Purchases by Individuals:</p> <ul style="list-style-type: none"> Percentage of individuals that made online purchases from national sellers Percentage of individuals that made online purchases from sellers in other EU countries Percentage of individuals that made online purchases from sellers abroad (other EU or non-EU countries) Percentage of individuals that made online purchases from sellers from the rest of the world (non-EU) Percentage of individuals that made online purchases from sellers with unknown country of origin Percentage of individuals that made online purchases from sellers abroad: physical goods (e.g. electronics, clothes, toys, food, groceries, books, CDs/DVDs) Percentage of individuals that made online purchases from sellers abroad: products downloaded or accessed from websites or apps (e.g.: films, music, e-books-e-newspapers, games) Percentage of individuals making online purchases from sellers abroad: travel, accommodation or holiday arrangements (e.g. tickets and documents by mail or printed by oneself) Percentage of individuals making online purchases from sellers abroad: other services (e.g. tickets for events received by mail, telecom subscriptions) Percentage of individuals making online purchases from sellers

²⁵ https://ec.europa.eu/eurostat/cache/metadata/en/isoc_i_esms.htm.

	Dataset coverage
Indicators available in dataset	abroad: travel, accommodation or holiday arrangements or other services (e.g. tickets for events received by mail, telecom subscriptions). <i>Where individuals include all individuals in all cases</i>

Source: Eurostat (2019d).

The underpinning source is the same as the ONS Internet Access publication. The main differences in the data presented by the ONS and Eurostat are differences in the coverage of data presented:

ONS and Eurostat data differ in geographic and demographic coverage

- The ONS publication covers Great Britain, while Eurostat data cover the UK – estimates for Northern Ireland supplied to Eurostat are based on a separate ONS survey of households in Northern Ireland (ONS, 2019c, August 8).
- The ONS publication covers adults aged 16+, while Eurostat data cover adults aged 16-74.

A high proportion of UK adults make online purchases from overseas, compared to the EU average

Eurostat data (Eurostat, 2019h) are useful for comparing UK online consumption patterns with those in other EU countries:

- In 2018, 41% of UK adults made online purchases from sellers abroad, higher than the EU average (27%) and up from 36% in 2017.
- In 2018, 28% of UK adults made online purchases from sellers from other EU countries, higher than the EU average of 21% in the same year.
- In 2018, 30% of UK adults purchased from non-EU sellers, compared to the EU average of 16%.
- In 2017, 30% of UK adults purchased physical goods (e.g. electronics, clothes, toys, food, groceries, books, CDs/DVDs) online from sellers located abroad. This compares with an EU average of 19%.
- In 2017, 11% of UK adults made online purchases from sellers abroad that were downloaded or accessed from websites or apps, compared to the EU average of 6%.
- In 2017, 16% of UK adults made online purchases from sellers abroad for travel, accommodation, or holiday arrangements or other services²⁶, compared to the EU average of 8%.

ONS and Eurostat business and household survey data are useful but suffer from a number of limitations

It is difficult to see how the data from the business and household surveys on e-commerce activity can be used to estimate the value of cross-border transactions, without adopting strong assumptions or collecting additional data. Publications of business e-commerce activity share similar weaknesses.

Additional limitations include the small sample sizes and voluntary nature of the household surveys, affecting the quality and representativeness of the data collected. In addition, the survey assumes respondents know whether the site that they are buying from is overseas (and not, for example, a site owned by a foreign company operating in the UK).

²⁶ Such as tickets for events received by mail, or telecom subscriptions.

While these publications provide some insight into the incidence of households and businesses engaging in cross-border e-commerce activity, there is no detail to identify the value of those transactions or to further break down the observations with a greater degree of regional, sectoral or product disaggregation. These limitations reflect the fact that existing surveys were not originally designed to collect complete information on e-commerce trade. However, currently, they are the best tools available to gather data on e-commerce trade.

3.2.2 Estimates of digitally-delivered services based on EBOPS and modes of supply data

Potentially ICT-enabled trade estimates

In the UK, attempts to estimate the value of services exports and imports that are *likely* to be digitally delivered have been made by mapping Balance of Payments (EBOPS) data to “potentially ICT-enabled” services²⁷, based on the classification outlined in section 2.3. Preliminary (unpublished) work to estimate this was undertaken by the Department for International Trade and developed further for this project.

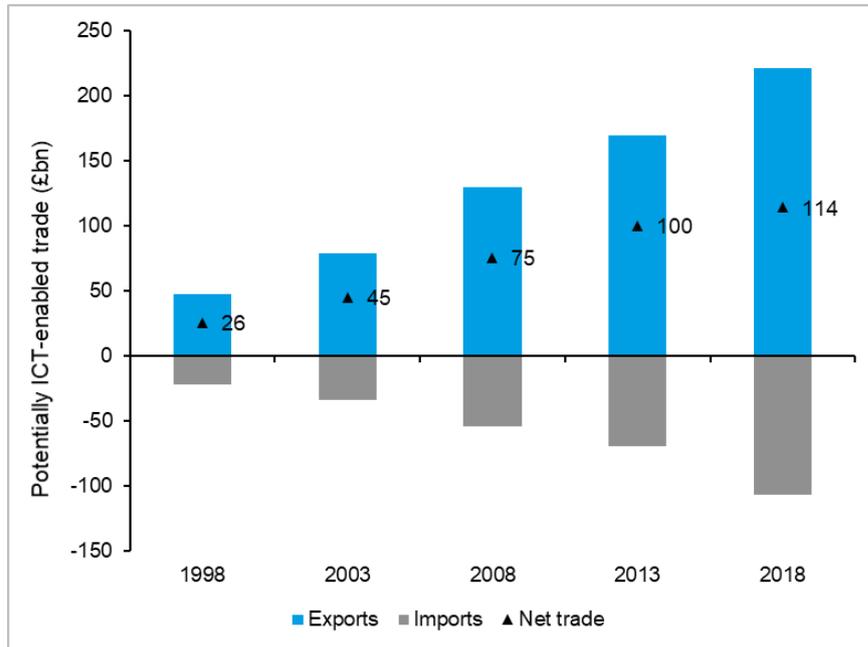
The estimates below are based on methods developed by UNCTAD (2015) and trade in services data published in the ONS Pink Book 2019 (2019f, October 31). These data currently cover the period up to 2018. More timely trade in services data, covering 2019, are available from the experimental ONS release “UK Trade in Services by Partner Country” (ONS, 2019e, October 23). However, these estimates are not as robust as the data from the Pink Book. In addition, they are less granular allowing only approximate estimates of potentially ICT-enabled services trade.

Net trade

Figure 3-4 outlines the net trade position of UK potentially ICT-enabled services for selected years over 1998-2018. The UK had a trade surplus in “potentially ICT-enabled services” of £114bn in 2018, with exports and imports amounting to £221bn and £107bn, respectively. This surplus has increased substantially (in nominal terms) from £25bn in 1997.

²⁷ In brief, potentially ICT-enabled services comprise ICT services and other potentially ICT-enabled services. The full list of services covered is outlined in Table 2-1.

Figure 3-4: Net trade of potentially ICT-enabled services, selected years†



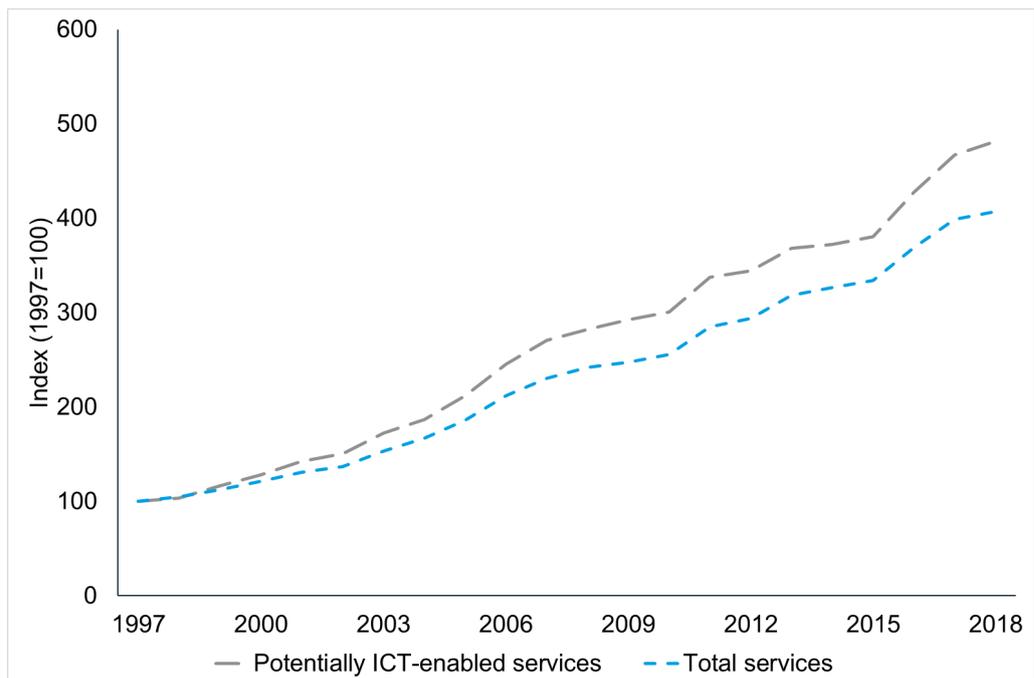
Notes: † Selected years are presented to give a representation of change over time; the full time series is available in a separate workbook accompanying this report.

Source: CE and DIT calculations, based on ONS, The Pink Book (ONS, 2019f, October 31).

Exports

The strong net trade performance of potentially ICT-enabled services reflects export growth outpacing import growth over this period. Figure 3-5 shows that the growth in exports of potentially ICT-enabled services has also outstripped growth in *total* services exports over 1997-2018.

Figure 3-5: Growth of potentially ICT-enabled services and total services exports, 1997-2018



Source: CE and DIT calculations, based on ONS, The Pink Book (ONS, 2019, October 31).

Other potentially ICT-enabled dominates potentially ICT-enabled service exports

Table 3-6 outlines the export performance of the different components of potentially ICT-enabled services exports. By 2018, exports of potentially ICT-enabled services reached approximately £221bn (in nominal terms), of which £208bn is in other potentially ICT-enabled services. Exports of other potentially ICT-enabled services comprise strong performing services such as Financial services (with nearly £63bn exports in 2018), Legal, accounting, management consultancy and public relation services (£33bn), and other business services such as research and development, advertising, market research, architecture, engineering, scientific and other trade related and technical services.

While ICT services export growth has been stronger (averaging 8.4% pa over 2010-2018, compared to 5.6% pa for other potentially ICT-enabled exports over the same period), its absolute contribution to potentially ICT-enabled services export growth has been much lower, due to the relatively lower value (ICT service exports totalled £13bn in 2018).

Table 3-6: Trends in potentially ICT-enabled services exports (£bn), 1997-2018†

	1997	2004	2011	2018	Average growth pa 2010-18 (%)
Potentially ICT-enabled services***	46	86	155	221	5.8
Of which:					
ICT services*	2	4	8	13	8.4
Other potentially ICT-enabled services**	44	82	146	208	5.6

Notes: † Selected years are presented to give a representation of change over time; the full time series is available in a separate workbook accompanying this report.

* Includes 9.2 ICT Services - Computer services, instead of a sub-component of this service according to the UNCTAD classification.

** Includes 9.2 ICT Services - Computer services, instead of a sub-component of this service according to the UNCTAD classification.

*** Potentially ICT-enabled services may not equal the sum of ICT Services and Other potentially ICT-enabled services due to rounding.

Source: CE and DIT calculations, based on ONS, The Pink Book (ONS, 2019f, October 31).

The EU is one of the largest markets for UK potentially ICT-enabled exports

Data by export market presented in Table 3-7 indicate that the EU is one of the largest recipients of UK potentially ICT-enabled service exports. Outside of the EU, the US comprises a large export market for the UK (accounting for over a quarter of total UK exports of potentially ICT-enabled services). This is perhaps unsurprising, given the size of and links between New York and London as global financial centres (Financial services is one of the services underpinning potentially ICT-enabled services).

Table 3-7: UK total exports of potentially ICT-enabled services, by main export market, 2018 (%)

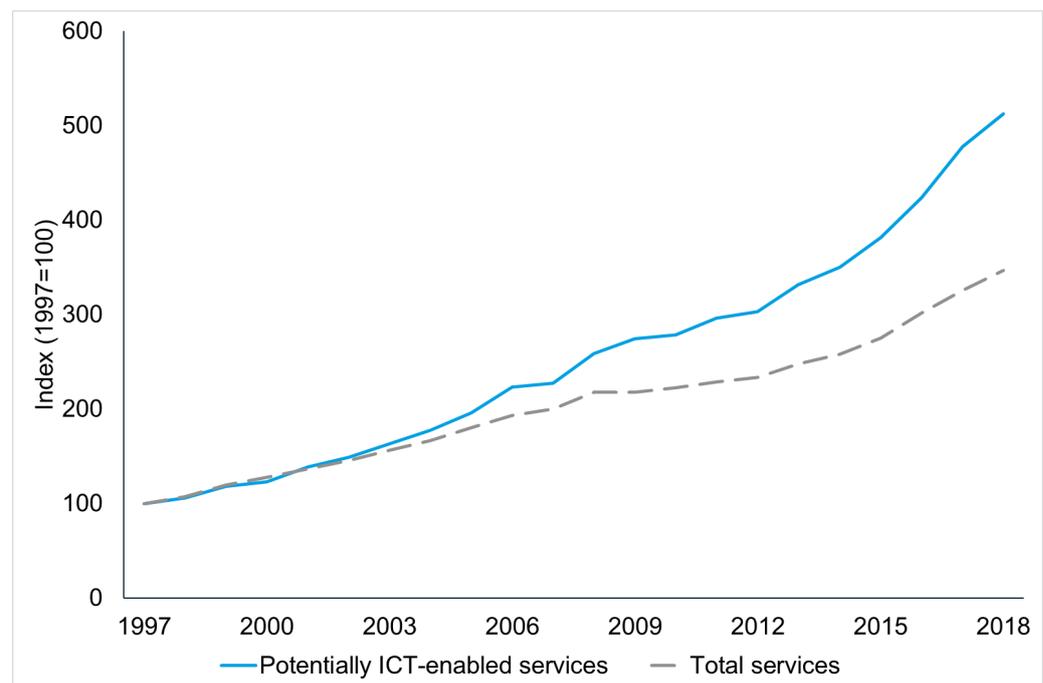
	EU	Non-EU (incl. the United States)	United States*	World
Share (%) of UK potentially-ICT enabled services exports going to...**	38.4	61.6	26.0	100.0

Notes: * including Puerto Rico.

** Estimates of potentially-ICT enabled services in this table are based on Pink Book data for EBOPS categories 6-11. These do not directly match those in Table 3-6 because they include EBOPS 10.3.2 and 10.3.3 - these categories are excluded from the headline estimates in Figure 3.4. Pink Book data by partner country and EBOPS are not granular enough to break down EBOPS by its various components at the 3-digit level. For ease of interpretation, the shares to each export market are presented instead.

Source: CE and DIT calculations, based on ONS, The Pink Book (ONS, 2019f, October 31).

Imports Similar to exports, growth in UK imports of potentially ICT-enabled services has outstripped that of UK import demand for total services (Figure 3-6).

Figure 3-6: Growth of potentially ICT-enabled services and total services imports, 1997-2018

Source: CE and DIT calculations, based on ONS, The Pink Book (2019f, October 31).

Import growth of potentially ICT-enabled services has outpaced export growth in recent years

Table 3-8 outlines the UK import demand of different components of potentially ICT-enabled services. By 2018, imports of potentially ICT-enabled services reached £107bn, with other potentially ICT-enabled services being the largest contributor. Growth of potentially ICT-enabled service imports has been strong in recent years averaging 7.2% pa over 2010-2018 – a faster rate of growth than that recorded for exports of the same services over the same period (5.8%).

Table 3-8: Trends in potentially ICT-enabled services imports (£bn), 1997-2018†

	1997	2004	2011	2018	Average growth pa, 2010-18 (%)
Potentially ICT-enabled services***	21	37	62	107	7.2
Of which:					
ICT services*	1	3	5	8	6.1
Other potentially ICT-enabled services**	19	34	57	99	7.4

Notes: † Selected years are presented to give a representation of change over time; the full time series is available in a separate workbook accompanying this report.

* Includes 9.2 ICT Services - Computer services, instead of a sub-component of this service according to the UNCTAD classification.

** Includes 9.2 ICT Services - Computer services, instead of a sub-component of this service according to the UNCTAD classification.

*** Potentially ICT-enabled services may not equal the sum of ICT Services and Other potentially ICT-enabled services due to rounding.

Source: CE and DIT calculations, based on ONS, The Pink Book (2019f, October 31).

As indicated in Table 3-9, approximately 40% of UK imports of potentially ICT-enabled services came from the EU in 2018, largely mirroring the patterns observed in UK exports of the same services. For all the regions considered, the UK remains a net exporter of potentially ICT-enabled services.

Table 3-9: UK total imports of potentially ICT-enabled services, by import source, 2017 (%)

	EU	Non-EU (incl. the US)	United States*	World
Share (%) of UK potentially-ICT enabled services imports originating from ...**	39.3	60.7	26.9	100

Notes: * including Puerto Rico.

** Estimates of potentially-ICT enabled services in this table are based on Pink Book data for EBOPS categories 6-11. They do not directly match those in Table 3-8 because they include EBOPS 10.3.2 and 10.3.3 - these categories are excluded from the headline estimates. Pink Book data by partner country and EBOPS are not granular enough to break down EBOPS by its various components at the 3-digit level. For ease of interpretation, the shares of each import origin country are presented instead.

Source: CE and DIT calculations, based on ONS, The Pink Book (ONS, 2019f, October 31).

The estimates above indicate that trade in digitally-delivered services is very important for the UK, accounting for the majority of UK trade in services. UK services that are digitally delivered accounted for 71.2% of total UK services exports and 47.3% of total UK services imports in 2017.

These estimates come with important caveats. Firstly, and as highlighted in Chapter 2, they only provide a partial picture of the scale of digital trade as they exclude large parts of digital trade (such as for example goods that are digitally ordered). In addition, the estimates are based on certain types of services that are *likely* to be delivered digitally - in practice, not all of these services are *actually* delivered digitally. Moreover, there may be other types of services that could be delivered digitally which have not been included in the estimates (where digital delivery is not the primary mode of delivery).

New experimental statistics published by the ONS estimate UK services exports and imports that are actually delivered digitally

Up until recently, UK official statistics did not allow a direct estimate of the value and proportion of cross-border services transactions that are *actually*, as opposed to *potentially*, delivered digitally. However, in July 2019, the ONS filled this important gap in statistics by publishing for the first time experimental trade in services statistics by modes of supply (ONS, 2019a, July 31; ONS, 2019b, July 31).

Modes of supply statistics describe *how* services are supplied to foreign customers – see box below and Chapter 5 of the Manual on Statistics of International Trade in Services (United Nations, 2011) for more detail.

Modes of supply – a brief introduction

International trade in services is covered by a set of rules called General Agreement on Trade in Services (GATS) which outlines four modes of supply for the delivery of services in international trade:

- 1 Mode 1 (cross-border remote supply) takes place when the service is supplied remotely, from the country of the supplier to the country of the customer (i.e. there is no movement of people across countries). An example would be legal advice provided via email or phone by a lawyer in the UK to a client abroad.
- 2 Mode 2 (consumption abroad) takes place when the person receiving the service travels to the country of the service supplier. In the above example, the customer from abroad visits the lawyer's office in the UK.
- 3 Mode 3 (commercial presence) takes place when a business establishes presence in a foreign country to provide services to foreign customers directly in that country e.g. a UK law firm sets up a subsidiary abroad to provide legal services.
- 4 Mode 4 (temporary movement of natural persons) takes place when a service provider in country A travels temporarily to country B to provide a service e.g. UK lawyer visits a customer abroad to provide legal services.

Digitally delivered transactions broadly correspond to Mode 1 of Supply (remote delivery)

Digitally delivered transactions correspond to a large degree to Mode 1 of supply since they are delivered remotely over ICT networks rather than via other means, such as for example in person (Mode 2 and 4) or by establishing commercial presence abroad (Mode 3). As explained in section 2.3, the concept of remote delivery (Mode 1 GATS) is similar but not exactly equivalent to digital (ICT-enabled) delivery, because it includes delivery of services by non-digital means such as by telephone, fax, email or post. However, in practice, the share of services delivery using non-digital means is considered negligible, therefore estimates for Mode 1 can be a meaningful proxy for digital delivery.

The ONS' approach (ONS, 2019b, July 31) builds on methods developed by the US Bureau of Economic Analysis (BEA) (BEA, 2016 May; BEA, 2019). The ONS estimates have been made possible by the inclusion of an additional question in the ITIS survey asking businesses to identify the proportion of their exports and imports of services that are delivered remotely (via Mode 1). Modes 2 and 4 were estimated as residuals using Eurostat methodology, while Mode 3 was not considered.

The ONS approach leads to better estimates of UK digitally delivered services trade

The main advantage of this approach is that information on digital/remote delivery is captured *directly* from businesses through the ITIS survey. Measuring services that are digitally delivered directly improves the quality of the estimates compared to those derived from methods that rely on assumptions regarding which types of services are potentially digitally delivered (such as the UNCTAD's potentially ICT-enabled approach) or experts' assessments and approximations on how certain types of services are supplied to foreign customers (such as the Eurostat approach).

An important limitation of the ONS survey is that it does not ask businesses to report modes of supply proportions by individual partner country. These are assumed to be the same for each country, therefore caution is advised in the interpretation of the geographical estimates. Another limitation is that the release does not capture Mode 3 trade (commercial presence) which leads to an overestimation of digital/remote delivery as a mode of supply when the data are reported in percentage terms. The ONS has plans to further develop its mode of supply data to provide a more accurate and comprehensive picture of how UK services trade is supplied. These include incorporating estimates for Mode 3 in future releases, improving the geographical estimates and exploring alternative data sources to supplement the data collected through ITIS.

Around £190bn of UK services exports and £52bn of UK services imports are delivered remotely/digitally

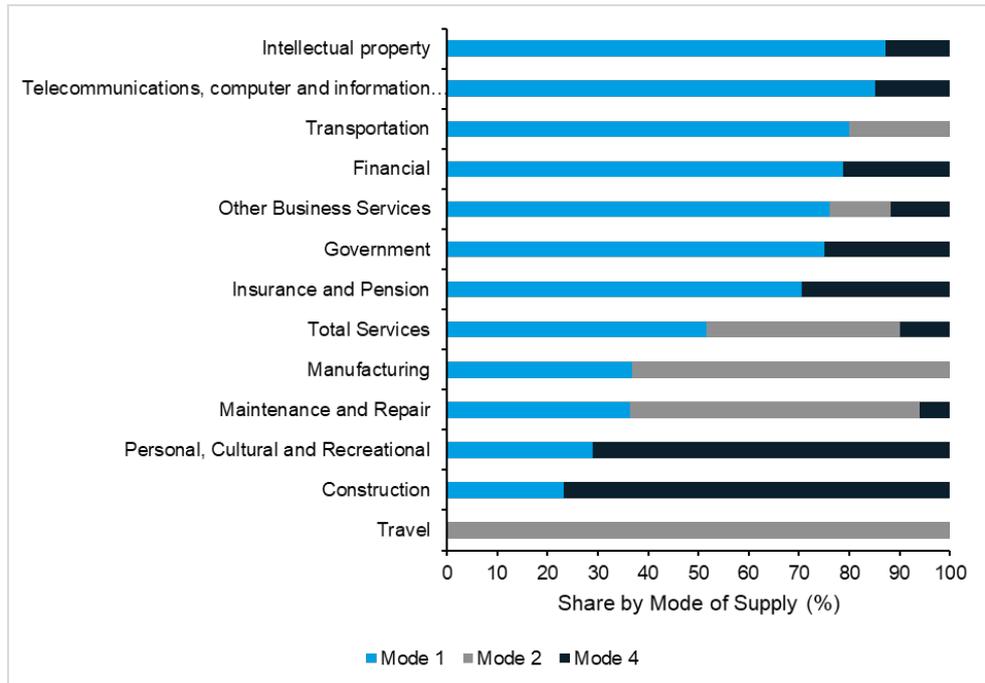
Excluding Mode 3, the estimates show that £190bn (67%) of total UK services exports, and £91bn (52%) of UK services imports, were supplied digitally in 2018 (assuming that remote delivery equates to digital delivery). This translates to a trade surplus in UK digitally delivered services of around £100bn in 2018.

Breaking down the results by type of service, it is estimated that a large proportion (more than 80%) of exports of Financial services; Telecommunications, Computer and Information services; Insurance and Pension services; and Intellectual Property services are delivered digitally. For imports, digital delivery is the dominant mode of supply for Intellectual Property services (87% delivered digitally); Telecommunications, Computer and Information services (85%); Transportation services (80%); Financial services (79%); Other Business services (76%); Government services (75%); and Insurance and Pension services (70%).

An interesting result is that the ONS estimates contradict the Eurostat (Eurostat 2016) and UNCTAD (UNCTAD, 2015) assumptions that certain types of services, such as Construction, Maintenance and Repair and Manufacturing Services, cannot be delivered digitally. The ONS attributes the result for Construction to "*businesses [in the sector] are likely to regard service subcontracting as a service being carried out remotely*". For Maintenance and Repair and Manufacturing Services, the ONS states that "*if inputs have been provided through remote means, then respondents may regard this as entailing Mode 1*" (ONS, 2019b, July 31).

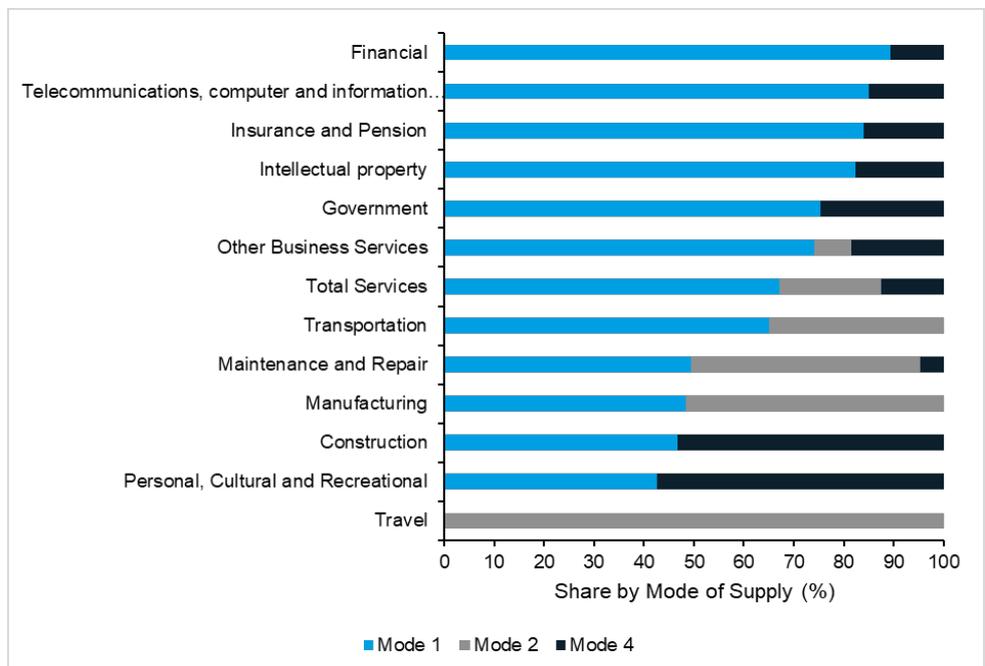
Figure 3-7 and Figure 3-8 below summarise the results for each type of service and mode of supply (excluding Mode 3).

Figure 3-7: UK imports of services by modes of supply (excluding Mode 3) and type of service, 2018



Source: ONS (2019a, July 31).

Figure 3-8: UK exports of services by modes of supply (excluding Mode 3) and type of service, 2018



Source: ONS (2019a, July 31).

3.2.3 Digital trade statistics compiled by DCMS

DCMS sectors estimates

Another resource identified is the Department for Digital, Culture, Media and Sport (DCMS) sectors economic estimates. The DCMS produces official estimates of the contribution of the DCMS sectors to the UK economy. The primary use of the statistics is to monitor performance of industries within the

DCMS sectors and to help advance understanding of how current and future policy interventions could be most effective. Table 3-10 summarises the main features of the DCMS import and export statistics.

Table 3-10: Coverage of DCMS sectors economic estimates for export and imports

	Dataset coverage
Time period covered	2010-onwards (length of time-series varies by indicator – see below)
Sample size	N/A
Geography	UK
Type of survey/mode	N/A (estimates derived from existing surveys and datasets – see below)
DCMS Sector coverage	<ul style="list-style-type: none"> • Civil Society (<i>though not included in trade release</i>) • Creative Industries • Cultural Sector • Digital Sector • Gambling • Sport • Telecoms • Tourism
Discontinuities in the data	<p>Import and export data (for services and goods imports and exports) are reported for only a limited number of partner countries (EU states, selection of other non-EU trading partners).</p> <p>Data on UK exports of goods and services to destination countries are only available for 2015 and 2016.</p>
Indicators available in the dataset	<p>Exports of goods and services by DCMS Sector and sub-sectors (excluding civil society) (£m)</p> <p>Value of exports (£m, 2010 - 2016)</p> <p style="padding-left: 20px;">Value of exports by destination country (£m, 2015 -2016)</p> <p>Value of tourism exports are presented as combined goods and services (£m, 2015 - 2016)</p> <p>Imports of goods and services by DCMS Sector and sub-sectors (excluding tourism and civil society) (£m)</p> <p style="padding-left: 20px;">Values of imports (£m, 2010 - 2016), Value of imports by origin country (£m, 2015 - 2016)</p> <p>Value of tourism imports are presented as combined goods and services (£m, 2015 - 2016)</p>

Source: DCMS (2019a).

DCMS sectors are comprised of sub-sectors defined by Standard Industrial Classification 2007 (SIC) codes. It is important to note that there is some overlap between DCMS sectors. There are some cases where a SIC code is used to define more than one DCMS sector but within an individual DCMS sector, there should be no overlap between the sub-sectors on a SIC-code basis. For example, the Cultural sector is defined using SIC codes that are mostly shared with the Creative industries sector. Given the overlap between DCMS sectors in terms of SIC codes, the DCMS-sector total cannot be constructed by summing the individual sector totals (DCMS, 2019a).

DCMS sector trade estimates are based on data from several sources

Estimates of trade are based on data from several sources, including the HM Revenue and Customs (HMRC) Overseas Trade Statistics, the ITIS survey, data from the International Passenger Survey, the Bank of England, and the Higher Education Statistics Agency (HESA).

Since there are no formally recognised imports or exports for Civil Society services (activity of non-profit, social-enterprise, and charitable organisations) from the data sources available, the sector is excluded from import and export data estimates (DCMS, 2019a).

The definition of the DCMS Digital Sector is based on and expands upon the OECD definition of the digital economy (DCMS, 2019a; ONS, 2015).

Not all trade activity within the Digital Sector is necessarily conducted digitally

It is important to note that trade activity within the DCMS Digital Sector is not necessarily digital trade. This is because not all trade activity within the Digital Sector is necessarily conducted digitally. The Digital Sector is defined only by a set of particular SIC codes and not the types of transactions that occur within it - as such a sizeable proportion of the trade within the sector may not be conducted digitally, while significant shares of trade from the Creative Industries or Gambling sectors may in fact be digital trade. Current statistical methods cannot capture the nature of trade transactions (i.e. whether they are digitally ordered and/or delivered) within sectors.

DCMS sector estimates (for all sectors) implicitly include the value of digitally ordered and digitally delivered trade

In the context of the OECD framework, DCMS sector estimates (for all sectors) *implicitly* include the value of digitally ordered and digitally delivered trade, provided that the activity sits within the SIC codes used to define DCMS sectors. Since the estimates are drawn from data from existing statistical frameworks, there is no detail available on the nature of the transaction underpinning the trade, and as such, limits the usefulness of the DCMS sector estimates as a source for digital trade information. For these reasons, the data available in the dataset are omitted from this report.

3.3 Data on barriers to digital trade

In contrast to the limited availability of data for digital trade, data on barriers to digital trade are available from multiple sources, for example:

- the data underlying the World Economic Forum's (WEF's) Networked Readiness Index (WEF, 2016) – which, covering many dimensions deemed to be important for digital activity, gives an overall picture of the 139 countries' network readiness;
- Eurostat's Digital Economy and Society indices (Eurostat, 2019f) – a set of measures on individuals and households detailing internet usage and barriers to participating in digital trade;
- data sources underlying UNCTAD B2C E-Commerce Index (UNCTAD, 2018) – a composite index of readiness for B2C e-commerce, giving a country level overall view;
- OECD's Digital Services Trade Restrictiveness Index (Digital STRI) (OECD, 2019e);
- European Centre for International Political Economy's (ECIPE) Digital Trade Estimates (DTE) (ECIPE, 2018) project; and
- ONS E-Commerce and ICT Activity survey (ONS, 2019g, November 29).

OECD Digital Services Trade Restrictiveness Index

Most of these indices are aggregated at the country-level, therefore are mostly useful for international comparisons and investigating cross-country performance. The direct relevance of the OECD's Digital STRI makes it a good measure of regulatory barriers to cross-country digital trade, and the results from the index are discussed in more detail below. In addition, we describe a bespoke piece of analysis by the ONS as another potential source.

The Digital STRI dataset contains the index values and component values of the Digital STRI for each OECD country and a further ten countries. The index's goal is to monitor (mainly regulatory) barriers that potentially have a negative impact on cross-country digital services trade. The index measures a country-level value on a scale of 0-1, where 0 means that there are no trade restrictions, while 1 means that the country is completely closed in terms of allowing cross-country digital services trade.

Underpinning the index and each component are responses to binary questions which measure various aspects of trade liberalisation:

- Infrastructure and connectivity;
- Electronic transactions;
- Payment system;
- Intellectual property rights;
- Other barriers affecting trade in digitally enabled services.

Some overall observations about trade barriers can be derived from the index values. Over time and on average, regulations surrounding digital trade are tightening; correspondingly, trade liberalisation measures are decreasing across the analysed countries (OECD, 2019d, January 23).

The data for the UK show no change in the composite index and its various components over the period 2014-2018. The UK scores relatively well on the index with a score of 0.123, it ranks joint 12th out of 45 countries, around 35% below the average score (0.187).

The strongest component that is adding to the country's Digital STRI score is the "Infrastructure and connectivity" category and two binary responses underlying that. The need for vertical separation in mobile services and the data protection regulation which prohibits the transfer of personal data to countries with inadequate privacy regulation make up more than 65% of the index's value in the case of the UK (the underlying values of the index can be obtained from OECD's Digital STRI simulator (OECD, 2019c)).

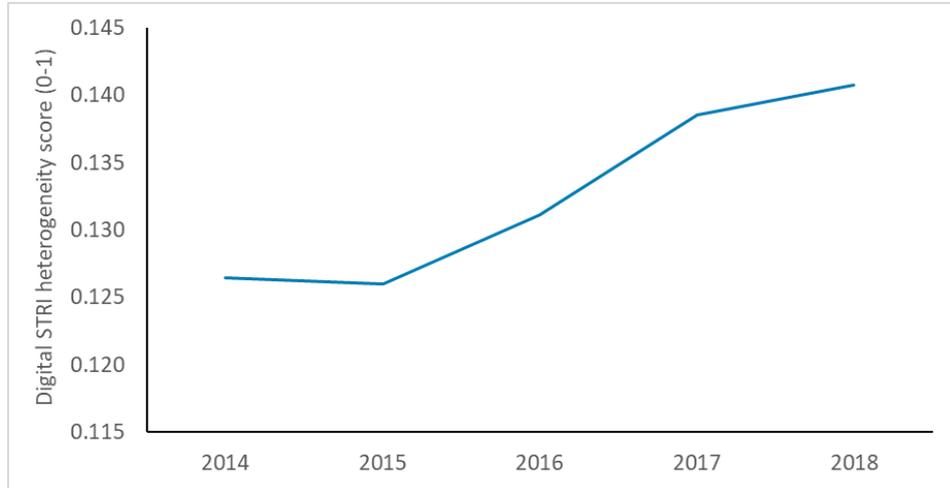
The dataset is also complemented by the Digital STRI Heterogeneity Index, which is based on the Digital STRI database and assesses the degree to which regulations across country-pairs differ. The values in this dataset reflect the share of measures for which the two countries have different regulations, with 0 indicating complete compatibility of regulations and 1 indicating that the regulations are opposite of each other.

Figure 3-9 shows an average trend for the UK across all countries, while Figure 3-10 shows this trend for UK and selected partner countries²⁸. While

²⁸ These countries are selected on the basis that changes are observed over time.

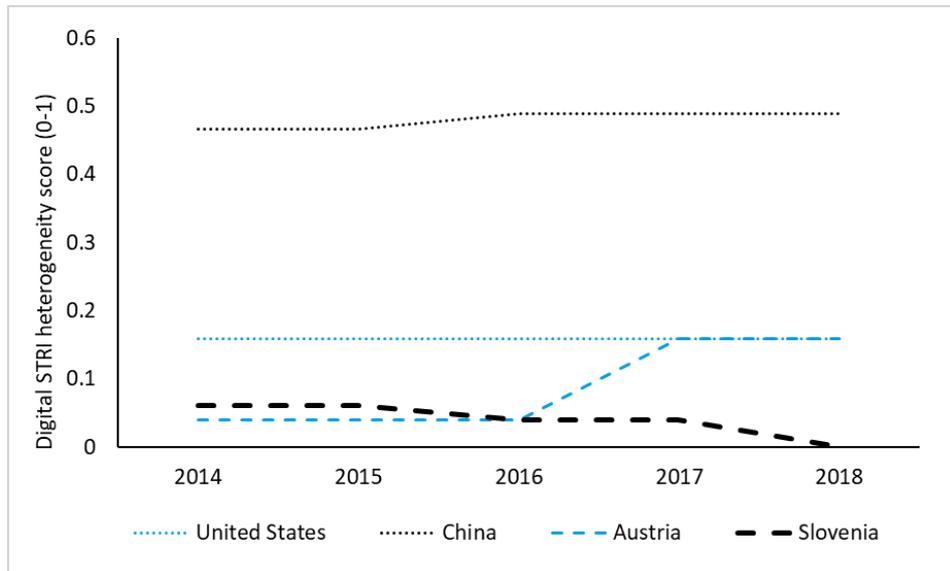
these time-series (similarly to the STRI values) have relatively small variation over the years, some insights are apparent.

Figure 3-9: Mean of regulatory alignment with the UK as partner across all countries



Notes: 0 means full alignment between regulatory regimes, 1 indicates opposing regimes. Source: Digital STRI Heterogeneity dataset (OECD, 2019f), SCORE indicator.

Figure 3-10: Regulatory alignment between the UK and selected countries



Notes: 0 means full alignment between regulatory regimes, 1 indicates opposing regimes. Source: Digital STRI Heterogeneity dataset (OECD, 2019f), SCORE indicator.

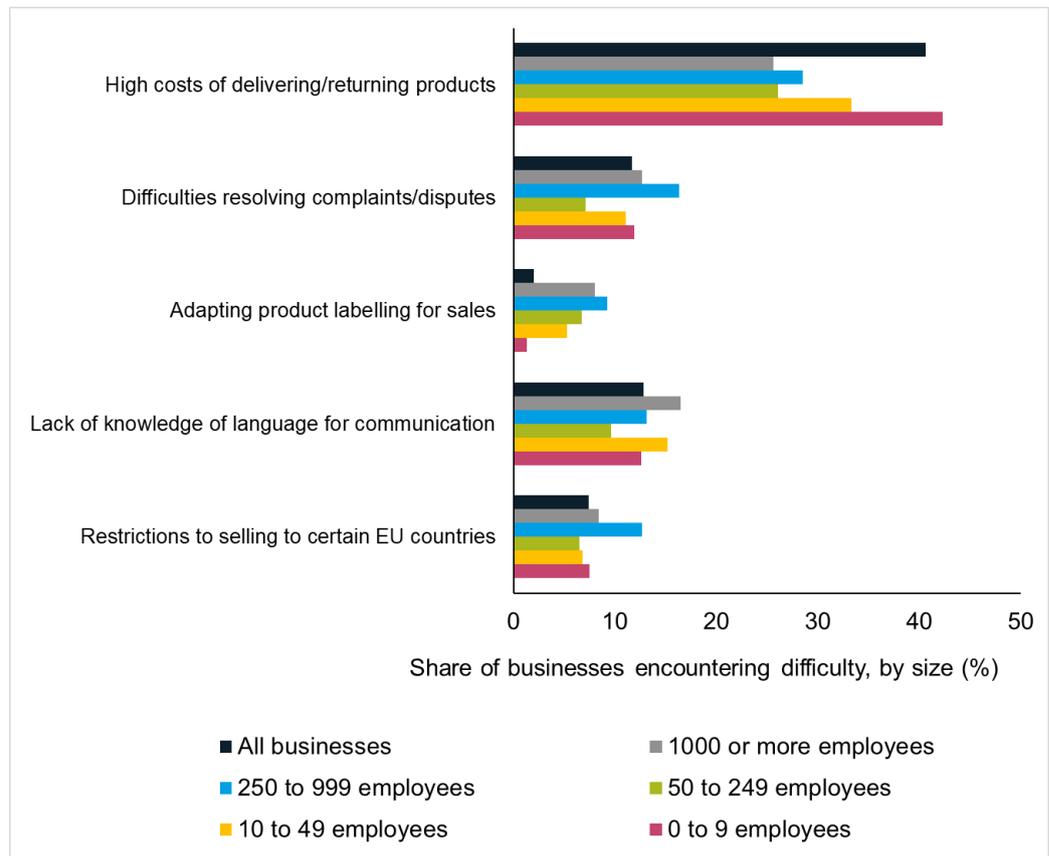
Generally, it is observed from the Digital STRI Heterogeneity Index that regulatory alignment surrounding digital services trade has diverged a little from the UK's viewpoint. The small uptick between 2015 and 2018 reflects direct changes in partner country regulations and not changes in UK regulations.

ONS estimates of barriers to e-commerce trade

Another source of data on barriers to e-commerce trade is the ONS E-commerce and ICT-activity survey (ONS, 2019g, November 29).

Figure 3-11 presents data on the nature and frequency of various difficulties UK businesses face when selling to other EU countries via a website or an app.

Figure 3-11: Share of UK businesses encountering difficulty selling to other EU countries via websites or apps (all businesses), 2018



Notes: Estimates cover businesses in all sectors except in Agriculture (SIC Section A), Mining and Quarrying (Section B), Veterinary activities (Division 75) and Government services (Section O-S except SIC 95.1). The base covers businesses that sell to other EU countries.

Source: ONS (2019g, November 29).

Of all UK businesses in 2018, 40.6% cited the high costs associated with delivering/returning products as a barrier to e-commerce trade. Difficulties around resolving complaints or disputes and language barriers were identified as the two second-most prevalent barriers to trade with approximately 12% of all UK businesses encountering these barriers.

3.4 Measurement challenges

Existing official statistics do not capture all elements of UK cross-border digital trade

There are several official sources of data that provide insights on cross-border digital trade transactions. For the UK, these cover digitally ordered household imports and digitally ordered business exports (but the monetary value of the cross-border element is not captured), and estimates of digitally delivered services exports and imports based on ONS EBOPS and modes of supply data.

Existing data on digital trade transactions (considered in section 3.2) were mostly collected with the aim of gathering information on the digital economy. As such, they do not cover all aspects of cross-border digital trade.

Several measurement challenges need to be considered in the context of developing high-quality data on digital trade.

3.4.1 Measuring “free” data flows

Accurately capturing the value of “free” data flows poses one of the biggest measurement challenges

Perhaps one of the biggest measurement challenges concerns the recording of data and information flows that are free (hence not captured in official statistics) but may generate revenue for businesses.

Websites such as YouTube, Facebook and Twitter, for example, provide digital media content free of charge to consumers, who in exchange, provide viewership and personal data (such as personal interest and demographic information relating to the individual consumer). The data collected are used by these sites to generate advertising revenue. While revenues from the provision of advertising services are captured in official trade in services statistics, it is not obvious if the data flows that underpin these advertising revenues are domestic or cross-border. The OECD framework does consider this issue, in part through the broader term of “Non-monetary digital trade”, which seeks to capture non-monetary transactions in information and data.

A similar problem arises with free data and services exchanged between and within businesses e.g. supply chain and HR information. Responses from data compilers in the OECD to the 2017 OECD/IMF stocktaking exercise (p.15, OECD/IMF, 2017): indicate that *“intra-firm transactions in cross-border data flows are unlikely to be recorded at all”* in official trade statistics.

3.4.2 Measuring transactions via digital intermediary platforms

Digitally intermediated transactions are difficult to identify

Transactions of goods and services facilitated by digital intermediary platforms (such as Uber, Amazon and Airbnb) also pose significant measurement challenges. As discussed in Chapter 2, it is not always clear where the intermediary resides, making it difficult for business and consumers to identify if they engage in domestic or cross-border transactions. Even if information on the residence of the digital intermediary is available, there is the question of whether cross-border transactions should be recorded on a “gross” or “net” basis, i.e. whether they should include the whole value of the service provided (gross) or just the value of the intermediation fee (net). Separating out the value of digital intermediation from the service provided is discussed in section 2.3 and includes a detailed discussion of the role of digital intermediaries in facilitating digital trade.

The Creative Industries Federation has identified this issue as a potential measurement challenge in their critique of DCMS sector estimates. It is not well understood how intermediaries engaging in foreign and domestic digital activity are captured in existing statistical accounts (Creative Industries Federation, 2018).

When asked if they are *“able to identify transactions involving non-resident digital intermediary platforms”* in the latest OECD stock-taking questionnaire, most countries outlined that *“it isn’t currently possible to identify these transactions and that this situation isn’t going to change in the near future”* (p.15, OECD, 2019b).

3.4.3 Measuring households' imports of digital services.

The value of household imports of digital services is typically not captured in official statistics

Another problematic area is the measurement of imports of digital services (e.g. digital downloads and streaming of music, movies and TV) by households.

Traditional surveys of international trade in services only capture businesses' sales and purchases of digital services to/from foreign businesses and consumers. For example, the ONS' ITIS survey can capture the export and import of streaming services by UK businesses but *not* UK household imports of these services (as households are not surveyed by ITIS). Similarly, and as discussed in section 3.2.1.2, existing household e-commerce surveys do not enable an estimate of the value of household imports of digital services because a) they do not distinguish between goods and services imports and b) they only capture the proportion of households buying online from abroad. By understating imports, the lack of data on the value of household imports of digital services may distort the trade balance of a country and underestimate overall cross-border digital trade.

3.4.4 Accurately capturing digital trade transactions when a share of these transactions falls below the de minimis reporting threshold

Growing de minimis trade may mean that the true size of digital trade would be underestimated

Another measurement challenge associated with capturing the value of digital trade accurately is around de minimis trade. De minimis trade includes transactions in value below the taxation and customs enforcement threshold. In many countries, prevailing data collection methods mean that small transactions below the de minimis threshold are not captured in official trade statistics. Digital trade transactions facilitated by marketplace platforms and auctions sites such as Amazon and eBay are typically very low in value, but very frequent (high in volume). Their exclusion could lead to a potential underestimation of the value of digital trade.

Existing statistical collection methods miss out on key characteristics of digital trade

Currently, no publication enables the estimation of the value of total cross-border digital trade, on its own, or in conjunction with other datasets. No single dataset accounts for all components of digital trade as defined in the OECD framework.

Existing e-commerce surveys are subject to a number of limitations:

- there are no estimates of the value of cross-border transactions;
- the surveys focus on total (domestic plus cross-border) digital trade. There are limited questions on the cross-border dimension;
- the surveys assume that respondents know the location of buyers and sellers. In practice, respondents may struggle to identify if they engage in cross-border trade, especially if the transaction involves intermediaries;
- there is no consideration of the role of digital intermediaries in e-commerce trade;
- there are limited questions on imports (most questions are on exports);
- the surveys are not very timely or frequent;
- samples sizes are typically small, and the household surveys are voluntary, raising question marks over the quality of the data;

- the surveys are not entirely internationally comparable due to differences in data collection and compilation methods across countries;
- there are no breakdowns by individual partner country, type of product or type of transaction (goods/services; digitally ordered/delivered/both; B2B/B2C/C2C etc).

Estimates of digitally delivered services for the UK are more robust and comprehensive, based on established and new sources of data (EBOPS/modes of supply), and include information on the value of cross-border transactions. In particular, the modes of supply estimates published recently by the ONS is a welcome addition to existing statistics in this domain, as they provide a direct measure of UK services that are digitally delivered. However, on their own, these statistics are unable to provide a complete picture of cross-border digital trade activity as they do not capture important elements, such as the value of digitally ordered goods. There is scope to improve the quality and granularity of these statistics further, for example by developing better estimates of Mode 1 services trade by partner country.

These issues are all important to consider towards developing appropriate and consistent methodologies to capture the value and dimensions of digital trade.

Data on digital trade need to be further developed

Overall, the current lack of clear and unambiguous data on digital trade motivates the requirement for new data collection methods and innovative techniques to develop and estimate the value of digital trade. Chapter 4 explores how better measures of digital trade could be developed.

4 Developing better measures of digital trade

Key Points

- Developing new, bespoke surveys for businesses and households is identified to be the key option that is likely to yield the most detailed and accurate estimates for the monetary value of digital trade. These surveys would enable better estimates of digitally ordered and digitally delivered products (and critically, instances where these types of transactions overlap) by type of product, type and location of trader, and flow (exports/imports).
- Implementing new surveys can be expensive and time consuming, and the benefits may be lagged as time series data will not be available for a number of years.
- A less-resource intensive option would be to introduce modules with questions specifically aimed at measuring the value and the different dimensions of digital trade in large scale, regular, business or household surveys conducted by the ONS. Surveys such as the Annual Business Survey, the Labour Force Survey or the Living Costs and Food Survey are well established and have large sample sizes, therefore likely to provide a greater precision and granularity of estimates. Another option would be to introduce new questions to existing ONS surveys, such as ONS's E-commerce and ICT activity and Opinions and Lifestyle surveys. Questions can be added to build on existing questions that only capture the incidence of cross-border e-commerce, to derive an estimate of the monetary value and capture the different dimensions of such trade. However, the detail would be limited compared to the information that could be obtained from dedicated surveys of digital trade.
- Digital trade facilitated by intermediaries is a difficult component of digital trade to measure, given the challenges with identifying intermediary platforms and measuring the intermediation fee (the fee may not be explicit from the cost of the product). A bespoke section in business surveys with specific questions targeted at intermediaries is identified as the most suitable option for estimating the intermediation fee of domestic intermediary platforms. However, survey methods alone cannot provide a complete picture of digital trade and have limitations, especially if respondents do not know the location of their trading partner. Therefore, surveys need to be complemented with other, more innovative methods (such as microdata linking, web-scraping and credit card data) to validate and expand the results from surveys. However, these methods are assessed to yield less comprehensive/rich estimates of digital trade.

4.1 Introduction

The lack of complete and coherent official statistics that can give a full picture of the size and nature of UK cross-border digital trade motivates the development of more innovative and targeted methods to collect the necessary data.

Our proposed approach advocates measuring the multiple dimensions of digital trade separately, even if the aim is to develop aggregate estimates of digital imports and exports. This is because a method that measures one dimension well may not easily be applied to another dimension. In addition, some dimensions may be easier to measure and the proposed method may yield more reliable estimates for some dimensions than for others.

This chapter considers possible methods to better measure digital trade in the UK, and in doing so, develops recommendations based on what we consider to be the most suitable options. We assess the suitability of options based on:

- The quality/detail of the estimate that they are likely able to provide (based on, for example, the ability to differentiate between different dimensions of digital trade); and
- The difficulty of implementation (based on the skills and timeframe required to implement the option).

Our proposed strategy maps individual approaches to individual dimensions of the OECD framework. This is outlined further in subsequent sections 4.2-4.5. We also give consideration of other possible methods that were explored; these are outlined in section 4.6. Section 4.7 summarises our recommendations. It is worth noting that digitally delivered estimates based on EBOPS and modes of supply statistics are not discussed in this chapter. As indicated in Chapter 3, we recommend that the ONS should continue its efforts to further develop its experimental modes of supply data, including producing more robust estimates of Mode 1 trade by partner country.

4.2 Proposed strategy

Table 4-1 gives an overview of the methods proposed by Cambridge Econometrics and the breakdown of the elements of digital trade that each method covers. Note that there is currently no proposed strategy for measuring imports from intermediary platforms.

Table 4-1: Recommended approaches for measuring digital trade

		Trade element captured	Quality of estimate	Detail of estimate	Difficulty of implementation	Potential Gains
1	Introducing questions to ONS Opinions and Lifestyle survey	Household imports ²⁹	Low	Medium	Medium	A faster and easier-to-implement approach, as a survey is already in place
2	Developing a new, bespoke, survey of households or adding new questions to existing ONS household surveys	Household imports, exports	High	High	High	Greater detail by sector, product, trading partner and type of transaction
3	Including Eurostat-recommended questions in the ONS e-commerce survey to capture value of cross-border transactions	Business exports	Medium	Medium	Low	Easiest to implement as questions have already been tested elsewhere
4	Linking ITIS and E-commerce and ICT activity data	Business exports, imports	Unknown/Untested	Low	Low	Data sources already exist
5	Introducing new questions to ONS e-commerce survey	Business exports, imports	Medium	Medium	Medium	A faster and easier-to-implement approach, as survey is already in place
6	Developing a new, bespoke, survey of businesses or adding new questions to existing ONS business surveys	Business exports, imports. Intermediary platform exports	High	Medium	High	Greater detail by sector, product, trading partner and type of transaction
7	Extending bespoke business surveys to identify trade through intermediary platforms	Intermediary platform imports	Medium	Low	High	Businesses should know what fees they are paying for intermediary platforms
8	Extending bespoke business surveys with questions for intermediary platforms only	Intermediary platform exports	High	Low	High	Easier way of identifying intermediary platforms

There has not been one identified option that is both easy to implement and able to capture the complexities of digital trade (such as differentiating between product types and the nature of the transaction i.e. whether the product is digitally ordered/delivered). As a result, we believe that it is important to consider multiple options simultaneously. These options vary in

²⁹ Theoretically, it could be possible to include household exports, however, in practice it is likely to be very hard to obtain reliable estimates.

the quality and detail of the estimate, as well as the complexity of implementation, but are considered within each of these dimensions as most suitable for estimating digital trade.

When referring to the difficulty of implementation, low, medium and high are determined by the cost and time required to implement the new method; the difficulty in design; ease of access to data/product owner; and required resources. For example, developing a new survey may give greater detail than adding questions to an existing survey; however, it would cost more to implement and may require greater design and testing (due to the quantity of questions) and so would have a higher difficulty of implementation ranking.

The quality of the data depends on how accurate the estimates would likely be and whether they clearly differentiate between the different elements of digital trade.

4.3 Household surveys of e-commerce

Introducing new questions to ONS Opinions and Lifestyle Survey

Quality of estimate: Low

Detail of estimate: Medium

Difficulty of implementation: Medium

The ONS' Opinions and Lifestyle Survey (ONS, 2017a, January) provides information on households' and individuals' use of the internet and other Information and Communication Technologies (ICTs). Currently, this survey contains only one question related to cross-border e-commerce:

In the last 12 months from which of these did you buy or order goods or services for personal use over the internet?

- UK sellers
- Sellers from other EU countries
- Sellers from the rest of the world
- Country of origin of seller is not known

Introducing new questions into the Opinions and Lifestyle survey would improve estimates of household e-commerce activity but is unlikely to be feasible

This provides an indication of the proportion of households that purchase or order goods and services from sellers in the UK or abroad via the internet. The survey cannot provide information on the value of these purchases; the types of products purchased (goods or services); the nature of transaction (whether these products are ordered and/or delivered digitally via for example a website or intermediary platform); and the type of transaction (B2C or C2C). Moreover, there is no information on sales (exporting) activity of households and individuals (C2C) via for example online marketplace platforms that facilitate such transactions, such as eBay and Amazon.

Introducing new questions would need to differentiate between all these dimensions of e-commerce trade. This is desirable but unlikely to be feasible given the quantity of extra questions that would be required. There are also significant question marks over the ability of respondents to provide this information. For example, it is unlikely that the intermediary platform question

results will be very useful due to the difficulty individuals may have in determining the location of the intermediary platforms and the intermediation fee. Furthermore, the sample size of the current survey is small and the survey voluntary. Unless the sample is increased and/or the survey becomes mandatory, the quality of the estimates will remain questionable.

Assuming no changes to the sample size or method of the survey, adding questions to this survey might therefore improve granularity but is unlikely to generate better estimates of e-commerce trade involving households. That said, the inclusion of additional questions in some specific areas, for example on household importing activity or expenditures by type of product (e.g. household purchases of accommodation and travel services via websites or intermediaries) would be useful and fill gaps in existing statistics.

Developing a new, bespoke, survey of households or adding new questions to existing ONS household surveys

Quality of estimate: High

Detail of estimate: High

Difficulty of implementation: High

Developing a bespoke survey of households is considered to yield significant benefits, despite the anticipated costs and burdens of implementing a new survey. A bespoke survey offers flexibility to identify in more detail the different components of e-commerce trade mentioned above, such as distinguishing between B2C imports and C2C exports, imports and exports of digital products, as well as between digitally ordered and digitally delivered.

Introducing a new survey may offer the greatest potential for improving the quality of the estimates, although there are also downsides. As mentioned previously, the ability of households to identify if a transaction is cross-border is questionable, and likely an intractable problem of household surveys in this domain. In addition, a new survey has a high level of difficulty of implementation due to the difficulties of designing the questions, testing and refining them before implementation. Furthermore, there may also be a lag after implementation, say of three or four years, before a time series that enables year-on-year comparisons is available.

An alternative option would be to explore the feasibility of adding questions specifically aimed at capturing digital trade to existing, established, ONS surveys of households such as for example the Labour Force Survey or the Living Costs and Food Survey. These surveys have large sample sizes and are conducted throughout the year, meaning that high quality and timely estimates of household digital trade activity could be obtained on a frequent basis.

A bespoke household survey offers flexibility to capture in detail the different components of digital trade involving consumers

With a large enough sample size, survey data can be reliable. However digital trade is a difficult topic to understand conceptually, even for practitioners in the domain. Therefore, it is important to ensure that individuals and households have the correct information and understanding to answer the questions. To ensure that there is no information asymmetry, clear examples would need to be provided. As mentioned above, a dedicated new survey, or a dedicated module on digital trade in existing ONS surveys could consider introducing questions that differentiate:

- the location of the supplier of a good or service

- the type of good or service purchased (based on, e.g. COICOP classifications United Nations (2018, December 26))
- the type of e-commerce transaction (B2C, C2C, etc.)
- whether the product is digitally ordered and/or digitally delivered, or both
- goods and services directly purchased through a company's website through an intermediary platform.

The last consideration is important as it provides an indication of the volume of digital trade that flows through intermediary platforms. This is not expected to identify the intermediation fee (which would be what is required for identifying the component of digital trade attributable to intermediaries). But, it could provide a rough approximation of measuring digital imports through intermediary platforms.

4.4 Business surveys of e-commerce

Including Eurostat-recommended questions in the ONS e-commerce survey to capture value of cross-border transactions

Quality of estimate: Medium

Detail of estimate: Medium

Difficulty of implementation: Low

Currently, the ONS publishes only an aggregate estimate of the value of UK business e-commerce activity – the annual E-commerce and ICT Activity release does not break down the turnover that UK businesses generate from orders they receive online from domestic (UK) and foreign customers.

To differentiate between domestic and cross-border transactions, Eurostat (Eurostat, 2019g) recommends that national statistical offices in the EU should include the question below in their e-commerce questionnaires:

What was the percentage breakdown of the turnover from orders received that were placed via a website or apps in 2018 by customers located in the following geographic areas? (estimates in percentage of the monetary values, excluding VAT) If you cannot provide the exact percentages an approximation will suffice.

- Own country
- Other EU countries
- Rest of the world

This question was not included in previous years' ONS questionnaires as it is optional. Adding such a question would be a relatively quick and easy method of estimating the monetary value of businesses' e-commerce exports, assuming that they can break down the values of their e-commerce sales into UK sales and cross border sales. This would be possible through combining the answers from the question above with a question which is already available in the survey on total turnover from e-commerce.

One limitation is that such a question would not differentiate between orders received via own website or app and those received via an intermediary

platform website or app, meaning that this method will not measure the component of e-commerce via intermediaries. However, the implementation of this option is considered to be less difficult than other options and, in fact, the ONS is implementing this option in the 2019 survey.

Linking ITIS and E-commerce and ICT activity data

Quality of estimate: Unknown/untested

Detail of estimate: Low

Difficulty of implementation: Low

Creating new methods or data sources to measure digital trade can be very time consuming. Although no current data fully capture digital trade, estimations can potentially be made by linking multiple existing sources.

For example, the ONS ITIS data capture trade in services by type of service. As discussed in the previous chapter, the survey was re-developed recently to capture remote trade (*“where a supplier in one country sells a service to a customer in another, but without the movement of people”* (ONS, 2019a, July 31)). This broadly corresponds to digital delivery and as this dataset develops, it will be a useful tool for measuring digitally delivered services.

Historical ONS E-commerce and ICT activity data capture the proportion of UK businesses that receive orders online from customers in the UK, the rest of the EU and the rest of the world. Therefore, linking the ONS trade in services and e-commerce datasets has the potential to provide some insights on the characteristics of businesses that engage in e-commerce trade. A similar approach can be followed by linking ONS e-commerce with HMRC trade in goods microdata, however, this is likely to be harder to implement.

A limiting factor of this method is that whilst it can identify the businesses and characteristics of businesses that engage in e-commerce trade, it is not clear that it would be possible to identify the value of such trade, given the questions currently asked in the questionnaire. However, it could provide an estimate of the share of digitally delivered services that are also digitally ordered.

Introducing new questions to ONS e-commerce survey

Quality of estimate: Medium

Detail of estimate: Medium

Difficulty of implementation: Medium

As with the ONS Opinions and Lifestyle Survey, the ONS e-commerce survey captures elements of the digital trade but lacks information on the size of this that is attributable to cross-border trade (ONS, n.d.). Statistics Canada has already taken a step towards measuring e-commerce trade by including a number of questions on e-commerce in their Digital Technology and Internet Use Survey (Statistics Canada, 2019).

What were this business's total gross sales conducted over the Internet in 2019?

In 2019, what percentage of the value of this business's gross sales was made over the Internet?

In 2019, what percentage of this business's gross sales conducted over the Internet were for the following goods and services?

a: Digitally delivered goods and services

b: Other Services

c: Physical goods

Developing the ONS e-commerce survey in a similar fashion to what has been adopted by Statistics Canada could help capture information on the various dimensions of UK cross-border e-commerce trade for which information is currently not available (e.g. values; imports; partner country; orders via website, apps or intermediaries; distinction between digitally ordered and digitally delivered; goods and services; B2B/B2C/B2G etc.). Information asymmetry is less of an issue with business surveys as businesses should know the location of their customers.

Developing a new, bespoke, survey of businesses or adding new questions to existing ONS business surveys

Quality of estimate: High

Detail of estimate: High

Difficulty of implementation: High

As with developing a new household survey, a new business survey dedicated to measuring business exports and imports of digitally ordered goods/services should at least differentiate between goods and services to avoid potential double counting (i.e. digitally delivered services – captured by EBOPS – that are also digitally ordered). Once again, the survey would need to better differentiate between sales through the businesses' own website and through an intermediary platform to allow their contributions to e-commerce trade to be separately considered.

A benefit of this approach over the household survey is that businesses should know the location of their customers, making it easier to calculate e-commerce trade with certain countries or regions. However, creating a new survey takes much longer to implement than adding questions to an existing survey and is only reliable with a large enough sample size. Nevertheless, with a survey dedicated to digital trade, there is more scope to identify in more detail the different components of digital trade and reduce the potential for double counting.

As with the household surveys, an alternative option would be to consider adding new questions on digital trade to existing surveys of businesses such as the ONS Annual Business Survey. The fact that these surveys are already established and have large sample sizes means that they are likely to produce more precise and granular estimates than those obtained from the smaller ONS E-commerce and ICT activity survey.

4.5 Identifying digital trade through intermediary platforms

Measuring transactions via intermediaries is much harder than any other aspects of digital trade (most of which could be measured via direct sales from a company's website).

Measuring the cross-border intermediation fee is particularly challenging

Firstly, measuring the contribution of intermediaries to digital trade requires knowing the size of the intermediation fee, and not just the value of the product that is being transacted. It is unlikely that demand-side surveys would be a suitable method for measuring this component of digital trade. There is a possibility that consumers do not know, or are unable to recall, the size of the intermediation fee when asked in a survey. This may depend on how the intermediary platform processes payments and whether the fee is directly identified in their receipts or bank and credit card statements.

Secondly, the location of the intermediary is not necessarily clear to consumers. Businesses may be more likely to know the location if they are selling through an intermediary and will have information on how much of the fee they pay and how much is passed on to the customer. If it were possible, a starting point may be to adopt assumptions for an intermediation rate on which to apply the total value of products transacted over an intermediary platform.

Extending bespoke business surveys to identify trade through intermediary platforms

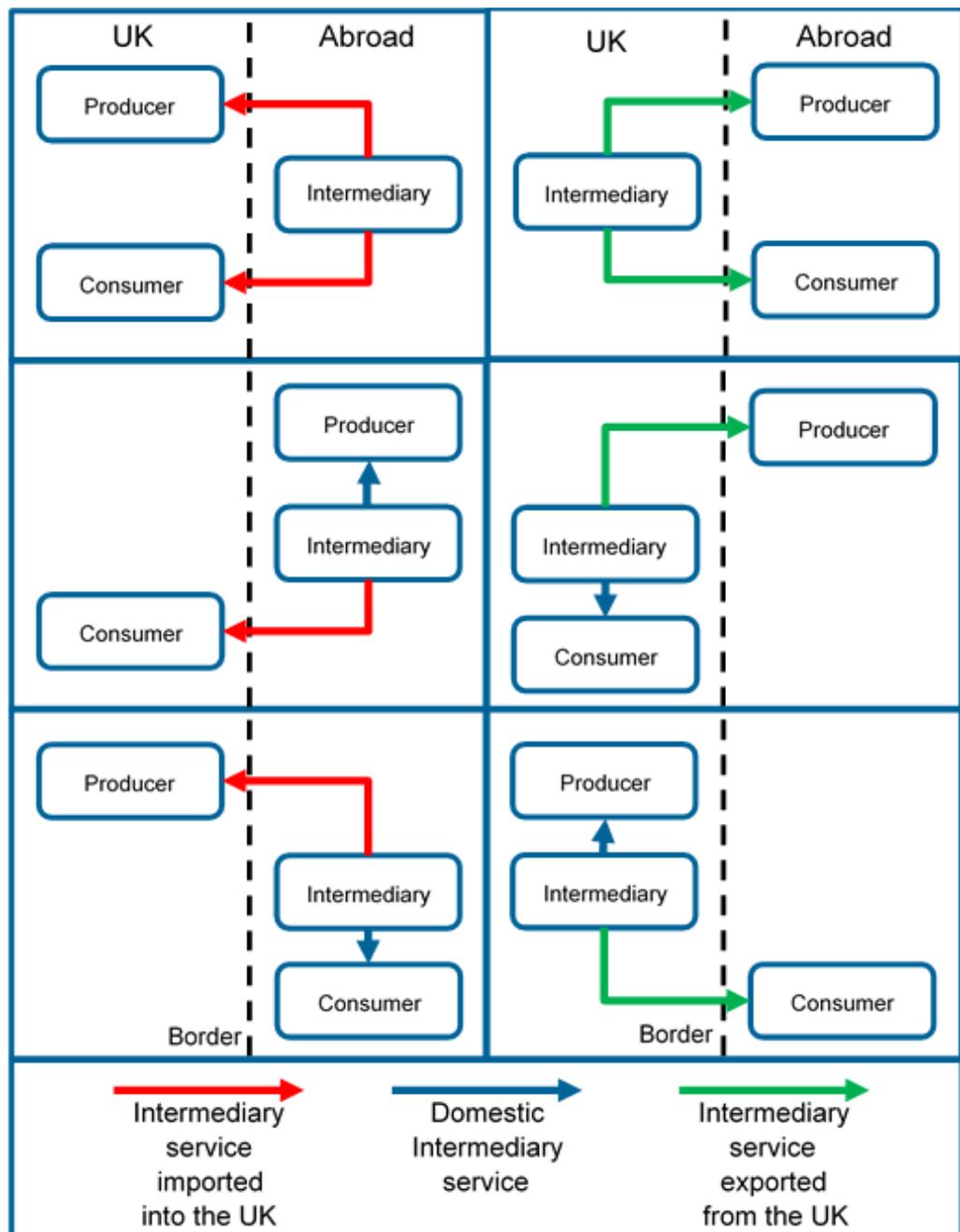
Quality of estimate: Medium

Detail of estimate: Low

Difficulty of implementation: High

The options available to identify trade via intermediaries are limited. Part of the challenge is the numerous forms that digital trade through intermediary platforms could take (regarding the fee only and not the cost of the product). The number of different forms helps explain why measuring digital trade of intermediary platforms is so difficult, as a different approach may be required to identify each type. In Figure 4-1, each of the six boxes denotes a different form of intermediary transaction in which cross-border transactions (i.e. digital exports and imports) should be considered.

Figure 4-1: Digital trade through intermediary platforms



Source: Cambridge Econometrics.

To capture trade facilitated by intermediary platforms, additional questions could be introduced to the bespoke business surveys proposed above to identify different types of digital trade. It is envisaged that the surveys would include additional questions to identify:

- businesses and households that sell or buy through intermediary platforms;
- if so, whether the business/household are required explicitly to pay a cost for use of the intermediary services;
- the location of the other business/household involved in the transaction.

In instances where the cost of using the intermediary services is explicitly outlined, it is considered feasible to identify the size of the intermediation fees (either by percentage of total price or by value). An assumption would have to be made that if the intermediary service explicitly requests a fee from either the buyer or the seller, then that fee is retained by the intermediary service. This measure would not be perfect, as the stated fee for intermediation services may not constitute the total value to the intermediary company.

Surveying businesses to measure the value of cross-border digital transactions conducted via intermediaries provides a useful starting point

The method proposed here captures only the types of digital trade highlighted by the red and green arrows, and in instances where the fee for intermediary services is explicitly outlined. In other scenarios, we consider it unlikely that businesses or households would have sufficient information about who is paying the fee, or, how large the fee is. For example, if a company pays a monthly subscription fee and a fee per-item sold, it may be difficult to distinguish the total fee per item and therefore the overall contribution to digital trade. There is also the added difficulty of separating digital trade and digital trade through intermediary platforms as some companies have multiple business models, whereby part of their business is an intermediary and part is an e-tailer. An example of this is Amazon, where Amazon Marketplace is an intermediary and Amazon Retail is an e-tailer.

Survey responses to these questions could enable an understanding of the sizes of fees and on average who pays these. Further disaggregation by product type would also be of interest.

From this information it may be possible to calculate an “effective intermediation fee rate”, which can be applied to the value of transactions going through intermediary platforms, and in which the cross-border dimension has been identified.

However, this would only provide an approximation, and the estimates are considered to be highly uncertain. To supplement this, it may be possible to augment the estimate of the value of digital trade via intermediaries when paired with other methods such as VAT data, credit card data, web-scraping, surveys for intermediary platforms and data directly from intermediary platforms. These other methods are discussed in section 4.6; however, it should be caveated that these methods are assessed to contain drawbacks and weaknesses, which renders them as supplementary options rather than the core proposed approach(es) to measuring digital trade via intermediaries.

Extending bespoke business surveys with questions for intermediary platforms only

Quality of estimate: High

Detail of estimate: Low

Difficulty of implementation: High

The discussion above relates to identifying from businesses the volume of cross-border trade passing through an intermediary. Adding questions to bespoke business surveys that directly ask whether a company is an intermediary, and if so, the intermediation fee of those companies, may be the best method of identifying and compiling data on intermediaries. The new bespoke survey discussed in section 4.4 could have a section of questions solely for intermediary platforms to determine the percentage of sales come from domestic/EU/rest of the world of both consumers and producers.

Some intermediary platforms may have a set rate for intermediary fees for consumers and producers. This would make calculating intermediary fees much easier for these businesses. However, as with surveying businesses that are not intermediary platforms, not all intermediary platforms may be able to distinguish the fee per item as easily as there may be multiple options of fees for producers with different monthly prices and costs per items, meaning calculating an average could be difficult³⁰.

4.6 Other considered approaches

Exploit data science techniques (e.g. web-scraping) to track activity of households and intermediaries

Quality of estimate: Low (medium to high³¹ if combined with other data sources, such as VAT data)

Detail of estimate: Low (possibly medium to high³² if combined with other data sources, such as VAT data)

Difficulty of implementation: Medium to high (depending on data access)

As online activity (especially online purchases) and computer processing power grows, data science techniques are being used to supplement more conventional data collection efforts; for example, the ONS has used web-scraping to expand the data they have for consumer prices (ONS, 2017d, September 1). Web-scraping is a method of extracting data from a website, either manually or through an automated process. The automated process allows for large quantities of data to be collated into a database for analysis. The information that can be obtained is limited to anything that a normal web-user has access to, such as prices and in some cases, remaining stock.

Scraping data on stock availability or quantity of products sold can help measure the *volume* of products sold/purchased via intermediary platforms; however, this would not identify the cross-border component or the value of the digital transaction. This can also be an expensive method due to the amount of processing power needed for constant monitoring capability.

Combining data science techniques with VAT data may provide estimates of the value of online cross-border purchases (imports) of individuals

A more feasible approach in this context is to combine data science techniques, including web-scraping, with data from administrative sources to estimate B2C digital trade transactions. This approach was first developed by Meertens et al. (2018) in the Netherlands. As mentioned previously, one of the major disadvantages of conventional (survey) methods for measuring online household purchases is that households are not always aware of the location of a supplier that they order a good or service from online. Within the EU, however, it is mandatory for companies selling above a certain threshold to other EU countries (€35,000 to €100,000 per year, depending on the member state) to file their tax returns in the country of consumption. Linking these VAT data with a business register to identify businesses active in retail trade, and then using web-scraping, machine learning and other data science techniques

³⁰ This is discussed further in Terms and Conditions for intermediary platforms section.

³¹ There is considerable uncertainty on the quality and detail of the estimate if used with VAT data, given that it is a relatively new method, and to our knowledge untested for identifying intermediary platforms specifically. Furthermore, the web scraping relies on identifying the “webshop” (through the presence of a shopping cart) –this may omit other websites that have webshops presented in a different manner.

³² See footnote 31.

to determine whether company websites include a webshop (identified by a “shopping cart”), (Meertens et al., 2018) were able to produce an estimate of the value of imports of goods ordered by Dutch consumers via the internet. The study found that the value of cross-border internet purchases of goods by Dutch consumers was six times higher than had previously been recorded through conventional survey data. The main advantage of this method is that it enables the collection of more timely data, based on robust (administrative) sources. While promising, however, it suffers from a number of limitations, including that a) it only covers online purchases of goods in the EU (i.e. estimates do not capture value of online sales (exports), services or non-EU trade) and b) it excludes below threshold traders (as these traders do not have to file a tax return).

Bilateral estimates of online sales (exporting) activity would theoretically be possible if all EU countries replicated this method and mirror (import) statistics were used. The Department for International Trade is currently exploring the feasibility of replicating (and improving) this analysis for the UK, in a joint project with the ONS Data Science Campus.

Web-scraping techniques could also be adopted to identify intermediary platforms. This could be achieved by scraping information from websites of businesses within a business register such as the ONS Inter-Departmental Business Register (IDBR) based on the characteristics of an intermediary platform. As mentioned above, a similar method has already been implemented in the Netherlands to identify webshops³³ (Meertens et al, 2018), through checking for a “basket” element (or clickable button to “buy”, “order”, for example) on the website. Intermediary platforms that fall under the umbrella of webshops, however, are likely to be only a small proportion. Intermediary platforms may have extra characteristics such as comparison tools and the option to sell as well as buy. The approach in the Netherlands did not attempt this and therefore could not separately identify an intermediary platform from the webshop of an individual company.

In summary, data science methods offer a promising alternative to traditional survey-based methods for capturing elements of digital trade activity. On their own, however, these methods are not enough to identify the value of online purchases and sales; but they could be used to identify firms operating digitally. Whilst this is not directly useful for measuring digital trade, it is useful in understanding some of its characteristics. This information could be linked with the business register to determine the employment and turnover of digital firms, as well as their locations in the UK and whether they are a part of a multinational enterprise (MNE).

Credit card data for household imports

Quality of estimate: Medium

Detail of estimate: Low-medium

Difficulty of implementation: Low to high (depends on access)

Credit card transactions can potentially be a relatively simple source of data for estimating digital trade. “Card not present” transactions (i.e. transactions

³³ Webshops are any website where a consumer can digitally purchase a product

when the card is not physically present) can be considered as a proxy measure for digitally ordered B2C and C2C transactions.

However, a major weakness of this approach is that it may capture not only cross-border, but also domestic, purchases (as the card is also not present for these purchases), and also purchases by telephone or fax which are not covered under the definition of e-commerce.

The discrepancy between the location where the payment is processed and the location of the buyer may lead to a mis-estimation of cross-border digitally ordered purchases using credit card data

To differentiate between a domestic and cross-border order, the transaction-level data would need to provide information on whether the payment goes to a recipient in the UK, or abroad; it is unclear whether such information is available from credit card data. A further complication is that credit card data store information on the location of where the transaction is processed and not the location of the seller. This discrepancy introduces uncertainty because transactions that may appear to be cross-border because the transaction is processed abroad could have originated from a domestic seller. This may lead to an overestimation of the value of the cross-border component.

Credit card data also may not be the best option given insufficient information on the types of products that are digitally ordered. More specifically, product distinction in credit card data is based on merchant category codes. These codes categorise businesses by the type of goods and services they provide; for companies which sell a large variety of products, a business-based classification is not necessarily sufficient information as the merchant category code is determined by the card company when the business starts accepting card payments. Credit card data can also be limiting in differentiating between digitally ordered goods, digitally ordered services, and digitally ordered and digitally delivered services, if the transaction-level data only provide the industrial classification of the firm.

Furthermore, and perhaps more importantly, access to credit card data can be difficult and may require changes in legislation; in the case of the UK, it is not clear what the legal implications of using credit card data are.

Nonetheless, credit card data have some benefits. Namely, if it is possible to access the data, in principle it is a relatively simple method to estimate digital trade. However, based on the relative strengths and weaknesses, it is clear that using credit card data does not necessarily offer any more detail than a survey-based approach to identify digital trade. Furthermore, the accuracy of this data for the purpose of estimating digital trade involving households is likely to be limited.

VAT/MOSS data for B2C exports

Quality of estimate: Low

Detail of estimate: Medium (telecommunication, television and radio broadcasting, and digital services only)

Difficulty of implementation: Low

The Mini One Stop Shop (MOSS) scheme was developed by the EU to ensure that VAT rates are applied to the location of the consumer of telecommunications, broadcasting and digital services. It is currently voluntary for businesses to provide data on international sales and the purpose of the data was not to measure digital trade. However, this data source could potentially still be useful to identify certain digitally delivered services, especially given that the scheme is open to all EU member states and other

businesses based outside the EU that supply EU consumers (widening the coverage of the data to beyond solely UK sources).

The voluntary nature of MOSS data introduces uncertainty regarding the representativeness of the dataset

But, there are some limitations to the data. Firstly, the scheme is voluntary and it is not clear whether the coverage would be sufficient to develop a robust-enough estimate of digital trade at the national level. However, it is difficult to know how representative this sample is, particularly because companies that only sell through intermediary platforms would not be captured in MOSS data.

Another limiting factor is that the scheme includes “non-taxable persons”, which includes public authorities. With no distinction between public authorities and businesses in the data, there is potential for over-estimating B2C transactions.

If a breakdown by sector or type of service is required, then MOSS data may not be the best source because there is no detail on the type of service provided. Furthermore, a total value of digital trade cannot be estimated from this source, given the lack of consideration for other components of digital trade (digitally ordered, or platform-enabled). Due to the limitations and uncertainty of the coverage, relying on any data from the scheme would not be recommended. That said, MOSS data should be investigated further to determine its usefulness and limitations.

Manual identification of digital intermediary platforms

Quality/detail of estimate: Low

Detail of estimate: Low

Difficulty of implementation: Medium

The number of intermediary platforms in the UK is difficult to quantify or classify. This is partly due to the lack of a coherent classification of intermediaries based on SIC codes. Table 4-2 below gives examples of some of the largest intermediary companies in the UK and their SIC codes. The large variety means that identifying these companies through any kind of systematic or quantitative approach can be very difficult.

However, there are very few large intermediary platforms, as shown by the European Commission study (European Commission, 2017) which found that only 4% of intermediary platforms screened in the EU (sample of 485) are defined as very large (having over 100,000 unique visitors daily). This does not, however, confirm that these few large intermediary platforms dominate the market as it may be that, collectively, the smaller intermediary platforms have a greater share of the market.

Table 4-2: Classification of intermediary companies in the UK

Company	SIC code
eBay	82990 - Other business support service activities not elsewhere classified
amazon	69109 - Activities of patent and copyright agents; other legal activities not elsewhere classified
Booking.com	82990 - Other business support service activities not elsewhere classified
Trip Advisor	79110 - Travel agency activities
Airbnb	96090 - Other service activities not elsewhere classified
Etsy	73110 - Advertising agencies
Deliveroo	52290 - Other transportation support activities;
	56290 - Other food services; 63990 - Other information service activities not elsewhere classified

Source: Companies House (n.d.).

That said, assuming that the intermediary fee value of smaller intermediary platforms constitutes only a small part of all intermediary platform fees, then manual identification of the largest intermediary platforms may be sufficient. A similar approach has been used before by the ONS for identifying businesses within the sharing economy (ONS, 2017e, November 9) where a decision approach was applied ruling out companies that do not meet all the criteria. Some intermediary platforms form a sub-set of the sharing economy and so this could be a good starting point.

The difficulty with manual identification of intermediary platforms comes with calculating the fee that these companies charge, if the fees are not explicitly identified. These fees would likely be embedded in the prices that buyers and sellers pay, and trying to split the fee out explicitly would be very difficult.

Exploit data held by intermediary platforms (Amazon, eBay, etc)

Quality of estimate: Low

Detail of estimate: Low

Difficulty of implementation: Depends on access

E-commerce and online payment platforms (such as eBay, Amazon, Gumtree and PayPal) collect data on usage statistics and purchases. These platforms enable digitally ordered and digitally delivered trade to occur between households and businesses. Data from these companies might be useful for identifying activity in the digital economy that is not currently captured in the ONS E-commerce and ICT-activity surveys (such as C2C transactions) and could be used for informing assumptions to separate out digital trade statistics from Balance of Payments data. An avenue of potential interest might be to explore if it is possible to determine a proxy fee value for all intermediaries (or a group of similar intermediaries) based on observed values for a select few. While conceptually appealing, this is likely to be more challenging than it seems. Data extracted from a particular group of intermediary platforms might not reflect representative fee values of sales through other platforms which may vary by the type of product or service that they provide as some goods/services markets may have a higher average fee than others. Whilst

this may give an insight into areas of digital trade that emerge from digital intermediaries, it is unlikely to capture the whole picture.

Improved electronic identification of parcels

Quality/detail of estimate: Medium

Detail of estimate: Medium

Difficulty of implementation: High

Obtaining better estimates of digitally ordered goods may also be feasible if further information is collected at customs via, for example, improved electronic identification of content, origin and destination of small parcels.

Results from the most recent OECD-IMF stocktaking questionnaire (OECD/IMF, 2017) suggest that only a small number of countries are currently exploring simplified electronic customs declarations as a new data source to improve their e-commerce statistics. This is an approach that the World Customs Organisation (WCO) has started to explore, evaluating current methods and working towards a united global system. Such an approach would help to improve our understanding of the size of de minimis trade i.e. transactions below the minimum threshold on which import duties are charged. There is evidence that this below-threshold trade has increased in recent years, reflecting the rapid growth of cross-border e-commerce trade - although it is worth noting that not all small parcel trade is linked to digital ordering (e-commerce).

In China, improved electronic identification is currently done through an e-commerce clearance platform in which businesses and intermediary platforms transmit comprehensive electronic information of e-commerce transactions (World Customs Organisation, 2017, March). Whilst the method captures trade through intermediary platforms and those directly from a company's website, it is unclear whether the data provide any differentiation between the two forms of transactions.

If the UK customs introduced this type of parcel identification, that does not mean that there could not be such a differentiation. Since the intermediary platform is required to give the details for this, there should be no information asymmetry on the fees paid if the information is being captured at customs. An obvious limitation of customs statistics is that they only cover digitally ordered goods. However, it might be possible to obtain further detail on B2B, B2C and C2C transactions (and could possibly differentiate transactions across different actors). An obvious disadvantage is the extra work required from customs agents to implement this.

Exploiting postal and parcel deliveries data (e.g. UPU)

Quality/detail of estimate: Low

Detail of estimate: Low

Difficulty of implementation: N/A (work undertaken by WTO, UNCTAD and OECD)

The Universal Postal Union (UPU) has sophisticated customs documentation (and tracking systems) for parcels. The UPU is currently working with the WTO, UNCTAD and OECD to help identify B2B and B2C digitally ordered goods. In terms of measuring UK digital trade this isn't very helpful as it concentrates on the quantity of goods rather than the monetary value. It also doesn't differentiate between goods ordered directly through a company

website or through an intermediary platform. Despite this, it is something to monitor as the UPU develops their work on this further in time.

**Applying
financial
intermediary
services
indirectly
measured
method**

Quality/detail of estimate: Low

Detail of estimate: Low

Difficulty of implementation: High

Financial intermediation services indirectly measured (FISIM) is a method applied to measuring implicit charges by financial intermediaries (FIs). This is calculated as the difference between the effective rates of interest payable and receivable and a “reference” interest rate (ONS, 2017b, April 24). The reference interest rate should represent the pure cost of borrowing funds, which is calculated based on the lending or borrowing relationships between FIs. For applying this to intermediary platforms, this method was considered for deriving an intermediation fee in instances where the fee is not explicit or clear. Although this would be consistent with the method used for financial intermediaries, it is considered unfeasible as a suggested approach due to the limitations of finding a “reference” rate for the products, with the only suggestion being the wholesale price.

**Terms and
Conditions for
intermediary
platforms**

Quality/detail of estimate: Medium

Detail of estimate: Low

Difficulty of implementation: Medium-High

Although including a Terms and Conditions page on a website is not a legal requirement, most companies have one. This is especially the case for intermediary platforms where many users will want detailed information on fees (for both selling and buying). Since most methods for measuring digital trade through intermediary platforms that have been explored have been limited in their ability to calculate the intermediation fee, one avenue explored is the presence of information directly from the intermediary platforms’ Terms and Conditions to determine the average fee.

However, there are often multiple ways that fees can be constructed. Therefore, calculating the fee per item may be much harder than expected. For example, eBay offers four different business fee options, with increasing monthly prices, but decreasing per item prices. This is made more complicated by the option to have a fixed price listing or an auction-styled listing (see Table 4-3).

Table 4-3: eBay fees for business sellers

	No shop	Basic	Featured	Anchor
Monthly Price	-	£25	£69	£399
Quantity of free fixed price listings	-	250	1500	Unlimited
Additional fixed price listings	30p	10p	5p	Free
Quantity of free 7-day auction style listings	-	50	300	500
Additional auction style listings	30p	15p	15p	15p

Source: eBay (n.d.).

Even for this one example, the additional information required to calculate the average fee per amount sold would be extensive. Information on what type of shop the business has; whether it was sold with a fixed price or through an auction; and how many products were sold in total through each method are all required. This is because the monthly price needs to be split between all products sold. Without the knowledge of the number of producers that host each type of shop and the number of products that these shops sell on average, it is not possible to create a representative average fee rate.

Tourism surveys **Quality of estimate:** Low

Detail of estimate: High

Difficulty of implementation: Low-Medium

Tourism surveys (namely, the International Passenger Survey) are a useful method for collecting data and already include questions on total spend for accommodation and other tourist requirements. Intermediary platforms are a common method for booking accommodation; one possibility may be to expand the survey to ask questions of bookings via intermediaries, for which there are already plans in place from the ONS. For intermediary platforms, however, there are limitations to this as it still needs to be paired with data on fees. Secondly, it only captures a very specific area of digital trade through intermediary platforms, which could be captured by other methods. That said, it is possible that the questions could be expanded to get a sense also of bookings direct from foreign accommodation and travel service providers, say, by asking how much of the holiday was purchased online and whether that was directly from a UK supplier, directly from a foreign supplier or through an intermediary platform.

4.7 Summary recommendations

Existing data for cross-border digital trade are limited, not just for the UK but worldwide, inhibiting our understanding of the size and growth of such trade. Traditional methods are insufficient for accurately capturing all aspects of digital trade, requiring new, more innovative, methods to be considered to fill the gaps in existing statistics.

Table 4-4 below gives an overview of our proposed strategy given in section 4.2 with more information on the types of information that would be captured based on our proposed approach. The options identified are capable of providing a mix of insights on both household and business trade, and some of these options have the potential to distinguish between different types of cross-border digital transactions, products and trade flows. Consolidating the efforts across all of the options is important in order to account for double-counting and verification of estimates across sources.

Few of the options identified are capable of providing product differentiation. The only options that do are bespoke surveys of households and businesses – either new or through adding questions specifically aimed at capturing digital trade in existing standard business and household surveys - but these are both assessed as being amongst the hardest options to implement. These surveys also appear to be only opportunity to distinguish between digitally ordered and digitally delivered trade. Unsurprisingly, the general rule is that the more detail required, the harder the implementation. Options (1) and (3) may be good starting points for obtaining better measures of digital trade. These options do not provide the detail that other options do, but are comparatively easier to implement. In that sense, they represent potential “quick wins”, from which lessons might be learned before expending greater resources to obtain more detailed estimates.

Table 4-4: Summary of proposed strategy

		Trade element	Difficulty of implementation	Nature differentiation	Product differentiation	To/from which actors
1	Introducing questions to ONS Opinions and lifestyle survey	Household imports	Medium	Total digitally ordered *	-**	-**
2	Creating new digital trade survey - households	Household imports, exports	High	Digitally ordered and digitally delivered	Yes (e.g., COICOP)	B2C and C2C
3	Include Eurostat recommended questions on ecommerce survey	Business exports	Low	Total digitally ordered	-	-
4	Introducing questions to ONS ecommerce survey	Business exports, imports	Medium	Total digitally ordered	-	B2C and B2B
5	Creating new digital trade survey - businesses	Business exports, imports	High	Digitally ordered and digitally delivered	Yes (e.g., Prodcop, EBOPS, SIC)	B2C and B2B
6	Extending bespoke business surveys to identify trade through Intermediary Platforms	Intermediary platform exports	High	Intermediaries	-	All through intermediary platforms

Notes: "Total digitally ordered" refers to methods that are only able to produce a single total estimate of digital trade, whereas "Digitally ordered" will allow for greater differentiation which is explained further in the "Product differentiation" and "To/from which actors" columns.

** While it may be possible in theory to add questions to the existing survey to collect information that capture both product differentiation and different actors, there are considerable challenges around that related to the likely large number of questions that would be required and how well households understand digital trade and its related concepts.

Source: Cambridge Econometrics.

5 Concluding remarks

5.1 Summary observations

There is an increasing need among policy-makers and statisticians to understand the scale and features of digital trade. But beyond just the nature and scale, an understanding is also required of the barriers to digital trade and how these may be reduced. Another component is recognising and maximising the benefits from digital trade, which primarily stems from a reduction in distance costs (opening up new opportunities and markets for exporters). At the same time, however, it is important to be aware of the costs associated with digital trade, which comprise legal, cultural and linguistic factors.

The scale of digital trade is relatively unknown

The scale and growth of digital trade are relatively unknown. Efforts to understand the value of digital trade have typically made use of existing nomenclatures and (non-digital-specific) trade datasets to estimate its scale, by identifying a subset of industries or products that align as closely with digital trade as possible.

The lack of a clear and common definition has not helped

Much of the research to date has used a heterogeneous mix of definitions of digital trade, some of which are quite narrow in focus and ignore the fact that non-ICT-related sectors can engage in digital trade. However, digital trade is not restricted to specific types of goods or services, and new digital products are not necessarily captured in existing statistics (such as in “barter” transactions in which data are exchanged for “free” services). Therefore, there is a need for a new conceptual framework to classify (and by extension measure) digital trade.

Ongoing work conducted by a consortium of international statistical agencies led by the OECD, WTO and the IMF seeks to address this knowledge gap. A part of these efforts involves the development of a Handbook on Measuring Digital Trade, which aims to provide a conceptual framework of digital trade, as well as best practice guidelines on how to measure its different components.

The OECD conceptual framework helps categorise and define different components of digital trade

The Handbook provides a useful foundation on which to build recommendations for measuring digital trade, and is overall considered to be the best and most advanced work to date in working towards a clear, coherent and comprehensive conceptual understanding of digital trade. Even so, the work to understand digital trade is by no means complete and important measurement challenges remain; new products and business structures in the digital economy are likely to require specific consideration, hence the need for a “living” document that is continuously improved and updated to capture new developments (e.g. cryptocurrencies, cloud computing etc.) and data collection initiatives.

Within the conceptual framework, the “nature” dimension best distinguishes digital trade from other more conventional types of trade. Conceptually, the “nature” dimension also best characterises the various forms that digital trade can take. For these reasons, the nature dimension underpins the assessment of the most suitable methods to measure digital trade.

Currently, no data explicitly identify digital trade

Given that a conceptual framework that would facilitate measuring digital trade has only recently been published, it is perhaps unsurprising that the available data on digital trade are very limited (notwithstanding efforts to measure the barriers to digital trade, mainly through the OECD Digital Services Trade Restrictiveness Index). The available datasets can broadly be classified into two broad categories:

- 1 data that measure incidence of digital ordering activity (“e-commerce”), but do not identify the monetary value of cross-border transactions;
- 2 data that measure cross-border services transactions, but do not explicitly isolate the components that are digital.

Regarding (1), existing e-commerce statistics are limited in their usefulness. They are unable to distinguish between the different dimensions of cross border e-commerce and do not capture the value of such trade.

In the case of (2), it is possible to derive a rough value estimate of the digitally delivered component of services trade (“potentially ICT-enabled services”) based on identifying the services which can in principal be delivered digitally. This can be considered as an approximation of the digitally delivered component of the conceptual framework. Estimates based on this approach indicate that UK exports for these services totalled approximately £221bn in 2018.

Experimental data published in July 2019 by the ONS provide an estimate of services that are actually, as opposed to potentially, digitally delivered

Experimental data published in July 2019 by the ONS provide a better estimate of UK digitally delivered services trade by identifying those types of services that are actually, as opposed to potentially, digitally delivered in services – via Mode 1 of Supply (services delivered remotely). The data show that digitally/remotely delivered services account for around two-thirds (£190bn) of total UK services exports, and around half (£91bn) of total UK services imports in 2018, excluding Mode 3 (this mode is omitted in the ONS estimates).

Although they fill a big gap in statistics in this domain, these estimates are imperfect as they only capture one component of digital trade (digitally delivered services). In addition, the data are experimental, meaning that further development is required to improve their quality.

Estimating total digital trade is complicated by overlapping dimensions

A corollary challenge with developing a total estimate of digital trade is the overlap of different aspects of digital trade, and that the different natures of digital trade are not mutually exclusive (e.g. digitally ordered products can also be digitally delivered). By extension, deriving an estimate of the scale of digital trade based on summing across estimates of the different components should ideally account for potential overlaps. Any efforts to measure the sub-components should not lose sight of this, and ensure that measures fit within the framework for measuring total digital trade (through accounting for instances where different types of digital trade transactions overlap) and the interactions between digitally ordered, digitally delivered, and digital intermediary enabled transactions.

5.2 Recommendations to better measure UK digital trade

The current lack of available data to adequately measure UK cross-border digital trade directs the focus to options to develop more detailed and more

accurate estimates of the value of digital trade. The identified options all likely differ in the accuracy and detail of estimates, as well as the resource and other cost implications.

The option that will provide the most detailed estimates is new, bespoke surveys for businesses and households

The option expected to deliver the required level of detail to best measure the scale and trend of digital trade is to develop new, bespoke, surveys for measuring e-commerce and digitally delivered products. The concepts of digital trade are complex, and the number of questions required to extract the necessary information in order to identify different components of digital trade is likely high. In developing new (business and household) surveys, there would be additional flexibility to identify individual components of digital trade. Business surveys could identify digitally ordered goods and services, and digitally delivered services, in which business purchases capture (B2B) imports, and business sales capture (B2B and B2C) exports. Household surveys could identify digitally ordered and digitally delivered (B2C and C2C) exports and imports. However, the development of new surveys is likely to be resource-intensive, and it could potentially take a long time for meaningful results to be obtained. There is also the added challenge of ensuring respondents have a clear understanding of digital trade and its related concepts so that they can provide correct and accurate responses.

But in the near term, introducing new questions to existing ONS surveys should be explored

In the near-term we consider it appropriate to explore the feasibility of introducing additional questions to existing surveys currently conducted by the ONS. While adding questions is unlikely to provide as much scope for exploring in as much detail the contribution of different components to overall digital trade activity, it is less resource-intensive and potentially quicker in terms of delivering estimates of its scale. Furthermore, introducing questions to existing surveys mitigates the need to consider issues such as sampling methodology and quality characteristics of the survey, given that these questionnaires are already established and in use.

One option would be to introduce modules with questions specifically aimed at measuring digital trade in large scale, regular, business and household surveys conducted by the ONS, such as the Annual Business Survey, the Labour Force Survey or the Living Costs and Food Survey. Another option could be to adapt the existing ONS E-commerce and ICT activity survey and the Internet Access Module of the Opinions and Lifestyle Survey, given the overlap in topic area. Questions can be added to build on existing questions that only capture the incidence of cross-border e-commerce, to derive an estimate of the monetary value and the different dimensions of such trade.

The most challenging aspect of developing recommendations to measure digital trade concerns the digital platform-enabled intermediary component. This difficulty stems from the characteristics of digital intermediary-enabled trade:

- there are many types of different transactions considered as digital trade when intermediaries are involved (depending on who the fee is levied from, the location of the consumer, seller and intermediary firm)
- it is difficult to isolate the intermediation fee in digital trade, given that this might not be known to the consumers or sellers

Bespoke surveys of businesses and households could help identify digital trade via intermediary platforms

Identifying the value of transactions flowing through an intermediary may provide some indication of scale of activity, and this could be collected through bespoke business and household surveys. However, this would not explicitly isolate the component of digital trade attributable to intermediaries, given that it would not identify the intermediation fee.

Introducing bespoke questions relating to intermediary platforms in business and consumer surveys on the fee that they charge is possibly the most suitable option for identifying the intermediation fee.

Surveys should be complemented with other, more innovative, approaches to validate and expand the results from surveys

But, surveying techniques are expected to fill most but not all the data gaps associated with digital trade. Given the significant measurement challenges, a mixture of other innovative data collection methods such as matching VAT data and web-scraping are suggested in order to validate or challenge the findings of the compiled figures. In addition, other approaches, such as using credit card data to identify card-less transactions as a proxy for digital trade, could be considered. Another option may be using VAT data based on an EU-based voluntary scheme that identifies the location of the consumer of digitally delivered services. These methods are useful and should be pursued, however, they are deemed to be complementary given the limited detail of the results that these methods are expected to provide. Ongoing initiatives by organisations such as the UPU to identify digitally ordered goods could in time provide benchmark estimates against which eventual estimates for the UK could be compared.

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