

Article

Feasibility of using administrative data sources for UK digital economy research: May 2022

Exploring the use of administrative data sources to help produce value estimates of the digital economy.

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Table of contents

1. [Overview of research into administrative data](#)
2. [Measuring the digital economy](#)
3. [Current work on the digital economy](#)
4. [Challenges in measuring the digital economy](#)
5. [Feasibility of using administrative data](#)
6. [Future developments](#)
7. [Related links](#)

1 . Overview of research into administrative data

- Increased popularity of digital products and platforms has affected how businesses and consumers interact with each other as well as the global economy.
- Existing surveys face challenges in fully capturing the digital economy therefore alternative data sources, such as administrative data are being investigated.
- Initial research with financial transaction data suggests this may be an option to mitigate survey coverage challenges.
- Further research will need to consider how to appropriately classify novel digital products within existing frameworks and reassess suitability of the data to support the digital economy survey once data are collected.

2 . Measuring the digital economy

Interest in the digital economy and its measurement is emerging internationally. Capturing the extent of the digital economy is of growing interest to policymakers and businesses. Understanding more about the impact on conventional trade and business practices by digitalisation can help policymakers make informed decisions on taxation, trade, infrastructure, and security.

The digital landscape is changing rapidly with the introduction of digital currencies and digital assets entering mainstream media and culture. The [Internet access - households and individuals, Great Britain](#) showed that in 2020, 96% of households in the UK had internet access. This was up from 57% in 2006 when comparable records began. The diversity of products and services that consumers can access online has increased exponentially in recent years, resulting in [£693 billion e-commerce sales by non-financial UK businesses in 2019](#). However, it is only a portion of the revenue generated by the digital economy as consumer-to-consumer (C2C) transactions are not captured.

The rising popularity of non-conventional businesses such as digital intermediary platforms (DIPs) and online marketplaces (OMPs) has considerably affected business and household spending. These digital platforms facilitate large volumes of transactions on a daily basis but are not fully captured in current business statistics. Global digital transformation has also made consumption of goods and services from abroad more accessible for businesses and households, allowing easier direct interaction with foreign businesses and consumers. Consumers are readily able to buy, sell and trade goods and services with other consumers all around the globe with the use of social media, DIPs and OMPs. This raises the importance of capturing the effect digitalisation has had on UK trade.

The coronavirus (COVID-19) pandemic has further exacerbated the impact of the digital economy. Retail sales figures show a rapid increase in online sales as public health measures lead to consumers moving to online platforms, [with online sales 60% higher in May 2020 than February 2020](#). There are indications that consumer behaviour has changed even as restrictions ease, with the [percentage of online retail sales still higher than before the coronavirus pandemic in January 2022](#).

Defining the digital economy

Because of the ever-growing nature of digital transformation, [the G20 digital economy task force report by Organisation for Economic Co-operation and Development \(OECD\) \(PDF, 9.41MB\)](#) put forward the following definition:

"The digital economy incorporates all economic activity reliant on, or significantly enhanced by, the use of digital inputs, including digital technologies, digital infrastructure, digital services and data. It refers to all producers and consumers, including government, that are utilising these digital inputs in their economic activities."

In line with this definition, a tiered approach is put forward to capture the different dimensions of the digital economy, which may be useful for research purposes. Further detail on defining the digital economy can be found in [Section 3 of our methodology on UK Digital Economy Research: 2019](#). A part of the digital economy, the [OECD Handbook for Measuring Digital Trade \(PDF, 4.31MB\)](#) defines digital trade as "as all trade that is digitally ordered and/or digitally delivered", with the focus on the nature of the transaction rather than the product.

3 . Current work on the digital economy

Following recommendations from [The Bean Review \(2016\)](#) (PDF, 5.13MB) and international guidance, investigating ways to produce estimates of the digital economy continues to be a priority of the Office for National Statistics (ONS).

Inclusion of additional questions to the International Trade in Services Survey in 2018 have made it possible to estimate the proportion of services provided by UK businesses that are delivered remotely, referred to as Mode 1 supply. While this is not a measure of digitally delivered services, it can be considered an upper bound estimate according to the [Understanding and measuring cross-border digital trade report \(PDF, 1.64MB\)](#). In 2020, it was estimated that 71.8% of imported services to the UK were delivered remotely and 82.1% of services were exported to overseas customers remotely. Further detail on this experimental analysis can be found in our [Trade in services by modes of supply, UK: 2020](#) article.

In 2020, the e-commerce survey was paused to be remodeled to better meet user needs. The survey has now been transformed into the [Digital Economic Survey \(DES\)](#), moving to include more questions in line with international recommendations. Data will be collected from businesses on digital orders, digitally delivered products, digital intermediary platforms, and cloud computing as well as e-commerce. Data from DES will potentially inform research into UK digital supply and use tables. Research is on-going to investigate the most appropriate methodology for using existing survey data to populate the OECD recommended framework for reporting the digital economy. As outlined in the [UK Digital Economy Research: 2019](#) article, data from [UK Manufacturers' Sales by Product \(PRODCOM\)](#) and the [Annual Survey of Goods and Services \(ASGS\)](#) can be used to expand the current product dimension in the supply and use tables and estimate the gross value added (GVA) of their respective digital products.

The sharing economy could be considered a part of the digital economy. Because of the sizable impact of digitalisation on the sharing economy, there appears to be overlapping characteristics; for example, transactions largely take place between individual consumers facilitated mainly by digital intermediary platforms (DIPs). Following [the 2020 progress update on the feasibility of measuring the UK sharing economy](#), we at the ONS are responding to user feedback by expanding our definition. The broader definition will include a wider range of perspectives of what the sharing economy is and will sub-divide this into sections to provide a range of estimates. We are continuing research to identify sharing-economy businesses and further develop current sampling as well as exploring other potential data sources to give a more rounded picture of the sharing economy.

4 . Challenges in measuring the digital economy

Sampling challenges

Existing business surveys have many benefits however, the current sampling techniques may mean some small and micro-businesses may be missed. Existing business surveys sample from the inter-departmental business register (IDBR), which is the most comprehensive register of UK businesses. The register uses Value Added Tax (VAT) and Pay As You Earn (PAYE) data. However, with rapid digitalisation and rising internet access, in recent years there has been a rise of businesses operating below VAT thresholds as more individuals establish micro businesses. In 2021, the [Department of Business, Energy and Industrial Strategy](#) (BEIS) estimated that 2.9 million business (52% of all businesses) operated without being registered for VAT or PAYE systems, increasing 38.6% since the 2008 economic downturn.

Consumer-to-consumer (C2C) transactions are also not often captured in official statistics. However, in recent years consumers and households have become a larger actor in the economy with the use of social media, digital intermediary platforms (DIPs) and online marketplaces (OMPs), according to the [UN's Manual for the Production of Statistics on the Digital Economy \(PDF, 2.33MB\)](#). Currently, these transactions are not comprehensively captured in the system of National Accounts, therefore we are unable to fully estimate the affect digitalisation has had on an industry basis.

Data collection and classification challenges

It is recommended that to fully capture the digital economy, surveys on digital activity will need to be developed to sample households as well as businesses. Other nations, such as Canada, have already begun work on [a survey of digital technology and internet use](#). Producing bespoke surveys would be a costly process requiring several years of evaluation and cognitive testing. We are looking at alternate routes to gain an understanding of the digital economy more quickly.

Increased accessibility to foreign retailers has also resulted in high numbers of low-value digital trade with more small parcels crossing UK borders. De minimis trade refers to trade that occurs below a reporting or taxation threshold, which differs for every country. This means a number of cross-border exchanges may not be sufficiently captured in UK trade statistics.

Digitalisation has also made it growingly difficult to distinctly categorise products as goods or services. For example, different trade rules apply depending on if the product is a good or service, however, with some digital products this is less clear. For example, as outlined in a [trade policy brief by OECD \(PDF, 686KB\)](#), "a 3D printing trade transaction involves a design service crossing a border, but at the moment of consumption it is a good". Therefore, there is ambiguity on whether this transaction would fall under goods or services trade laws.

5 . Feasibility of using administrative data

Financial transaction data

Building on international recommendations, this article looks to assess the feasibility of corroborating survey and alternative data sources to produce estimates of the digital economy. Administrative data are often used as an alternative statistical data source because of cost benefits, use for survey validation or as it can capture data where surveys cannot. Using administrative data to supplement and validate survey data can produce stronger estimates of the economy.

The Office for National Statistics (ONS) is investigating the feasibility of using financial transaction data to help produce estimates of the digital economy. We already use financial transaction data. CHAPS data from the Bank of England are used as a real-time economic indicator for the [Economic activity and social change in the UK, real-time indicators](#) articles and [the International Passenger Survey](#) uses foreign-issued card spend data to estimate travel and tourism figures. As part of ONS' response to the coronavirus (COVID-19) pandemic, [financial transaction data has been used to help meet government needs](#).

Using the financial transaction data for validation of survey results can be an important cross-check to assess transaction types and values are reported accurately. These data can also be useful for imputation process, where if there is no answer from a respondent, an estimated figure is produced. These measures are an important part of data processing, to ensure we are producing quality estimates. Another attraction to administrative data is the possibility to mitigate some of the coverage issues of surveys such as non-Value Added Tax (VAT) registered businesses not being sampled.

Initial research

A feasibility study was carried out to assess whether the financial transaction data available to the ONS would be suitable for these purposes, specifically for the Digital Economic Survey (DES). At the time the survey was not released, therefore the feasibility study compared data from the 2019 e-commerce survey and the financial transaction data. Initial exploration of the aggregated data showed similar trends in the time series of the e-commerce and the financial transaction data. This suggests that the financial transaction data may be suitable to support the validation of survey data. We were able to identify remote spending from in-store spending in the financial transaction data, which was an additional benefit. The remote transaction data would also include non-website (such as telephone) transactions; however, it is recognised as a good estimate of digital ordering.

Challenges with financial transaction data

The overlapping time periods available for the e-commerce survey and the financial transaction data were less than a year; therefore, further research will need to be conducted to see if trends will hold across longer periods of time. Additionally, there are some challenges of verifying financial transaction data, and administrative data in general, as opposed to data collected from business surveys. With business surveys, atypical responses can be validated and verified by contacting the respondent, however as administrative data are large in scale and collected for non-statistical purposes, this is not possible. For example, where business accounts may have been used for personal expenses and or the other way around, the financial transactions data would only record the transactions as they appear. Future research will need to consider how to mitigate the impact of these instances.

The financial transaction data are classified based on the business or "merchant" using the Merchant Classification Code (MCC). An initial mapping exercise was undertaken using available meta-data for each dataset, MCCs were mapped manually to standard industrial classification (SIC) codes. With the current data, MCCs are able to be mapped down to the 2-digit division level; however, mapping at a lower than a 2-digit level reduced the sample. This was because of some MCC capturing multiple activities in one code, making it challenging to map them to a singular lower level SIC code. The financial transaction data appear to provide a broad range of industries, although further analysis is required.

The industries initially mapped from MCC to 2-digit SIC level:

- Part of the Agriculture sector (A)
- Part of the Manufacturing industries (C)
- Electricity, gas, steam and air conditioning supply industries (D)
- Water supply; sewerage, waste management and remediation activities industries (E)
- Part of the Construction sector (F)
- Wholesale and retail trade and repair of motor vehicles and motorcycles industries (G)
- Transportation and storage industries (H)
- Accommodation and food service activities industries (I)
- Information and communication industries (J)
- Financial and insurance activities industries (K)
- Part of the Real estate activities industries (L)
- Part of the Professional, scientific and technical activities industries (M)
- Administrative and support service activities industries (N)
- Public administration and defense; compulsory social security (O)
- Education (P)
- Human health and social work activities (Q)
- Arts, entertainment and recreation (R)

A caveat of using the financial transaction data is that MCCs are based on the predominant product when the business first began using the financial transaction method. As such, it may not be representative of the current business model. This is a wider challenge with industry classifications systems, as more businesses have multifaceted branches of income in different industries that may not be accurately reported. For example, a business may be classified as Publishing activities (industry J) however majority of their revenue may come from advertising (industry M).

It is important to consider that there is no singular financial transaction method that provides uniform coverage across the economy. Businesses and consumers may use a particular payment method for numerous reasons such as ease or certain benefits. Similarly, they may switch transaction methods as it suits them. This provides a challenge on understanding whether patterns in the underlying data are natural and representative of the economy or an artifact of business and personal decisions.

6 . Future developments

Digital economy research aims to introduce improved statistical processes into the National Accounts framework, to ensure it is accurately capturing all aspects of the economy, as well as highlight the currently captured data on the digital economy. The current research is based on data collected from the e-commerce survey which has now been replaced with the Digital Economy Survey (DES). Similar analyses will need to be conducted with newly collected DES data to assess the comparability of the financial transaction data prior to beginning any research for imputation and validation purposes.

Statistical frameworks such as the system of national accounts often have rigorous product classification, therefore further consideration will need to be given on how to incorporate these new products into existing frameworks. Currently, two approaches are being taken to tackle this. Work is being undertaken internationally to update the standard industrial classification (SIC) and central product classification (CPC) classifications with consideration to challenges from the digital economy. Another approach is the development of a digital supply and use table framework, which aims to engage with economic activities that do not fit fully into current industry and product definitions.

Some statistics are dependent on the distinction between goods and services however as outlined previously, this can be a challenge with some digital products. Work will need to be undertaken to understand how to address this issue going forward. Additionally, with the financial transaction dataset, merchants will need to be manually mapped into goods or services prior to any granular analysis. This work will also be beneficial for digital trade and de minimis trade estimates. Research regarding de minimis trade is currently being scoped. Work within this area is novel and we are investigating possible avenues of data sources.

Prior to progressing with digital trade research using administrative sources, additional work will need to be carried out to understand more about how location data of a transaction is captured. For example, is this based on the business or household address at registration or where the transaction is processed such as via a clearinghouse. It is essential to understand more about this as a domestic transaction may be classed as a cross-border trade unless measures are taken. This is also a key challenge with digital intermediary platforms (DIPs). We have already begun work on understanding more about [DIPs and their impact on digital trade](#). This research will continue to develop as results come in from the DES.

Further consideration and research regarding the caveats outlined will need to be taken however we believe there is potential to use a combination of survey and this administrative data to provide an improved measure of the digital economy.

We would appreciate user feedback on research priorities within the digital economy. To provide feedback, please email ecommerce@ons.gov.uk.

7 . Related links

[The feasibility of measuring the UK sharing economy: October 2020 progress update](#)

Article | Released 20 October 2020

The challenges of analysing sharing-economy characteristics using survey responses from known sharing-economy businesses in the UK.

[UK Digital Economy Research: 2019](#)

Article | Released 28 January 2022

Research developing a framework for measuring the digital economy, including estimates and future plans.

[UK Trade in services by modes of supply: 2020](#)

Article | Released 25 February 2022

Experimental estimates of UK trade in services by Mode of Supply, country and service type on a balance of payments basis.

[Developing UK digital trade statistics](#)

Article | Released 5 May 2022

An introduction to digital trade and future plans to develop estimates.