

2024

# State of the UK Digital Economy

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## Executive Summary

The UK has the most advanced digital economy in Europe. The combination of the UK's supply side strengths and mature digital consumer market has made it a leading destination for inward investment, helping support a thriving ecosystem of UK start-ups and scale-ups, global tech companies and wider businesses taking advantage of digital technology.

### The Direct Impact of the Digital Economy

- ❖ Together, the digital economy and online retail support £227 billion in economic activity (GVA) and over 2.6 million jobs in the UK. This direct footprint is equivalent to 10% of GVA or about 1 in 13 jobs.
- ❖ Average pay in the digital economy stands at about £45,700 per year, over £12,000 (37%) more than the £33,400 seen for the UK as a whole. These jobs are located right across the UK.
- ❖ Beyond its direct impact, the UK's digital economy also supports a significant indirect supply chain of other businesses that support it. This supply chain creates an additional £113 billion in GVA and supports another 1.6 million jobs, a further 5% of GVA.
- ❖ The combined share of employment directly and indirectly related to the digital economy is about 1 in 8 jobs.
- ❖ The digital economy supports employment across Britain, as shown in official data from the Business Register and Employment Survey. Beyond London, parliamentary constituencies with sizable digital economies include Manchester Central, Glasgow Central, Leeds Central, Bristol West, Reading East and Reading West.

### Enhancing the Productivity of Other Businesses

- ❖ Increasingly, every company in the economy is a digital one - with the tools provided by the sector helping:
  - ❖ **Businesses and workers** draw on digital tools and services to help them improve productivity, raise wages, reach new customers and export internationally. As a lower bound, we estimate that the contribution of ICT capital alone in higher productivity has supported the equivalent of around another £3,000 in increased wages for the average worker.
  - ❖ **Consumers** benefit from a diverse range of cheap or free online services. The digital sector has created some of the most innovative products of the last few decades, helped reduce the cost of living, and made it significantly easier to access a wide variety of goods. In 2023, digital ad-supported free online services generated £412 billion in consumer surplus in the UK.

- ❖ **Public sector organisations** have been able to use digital tools to increase the efficiency, reliability and flexibility of key services. AI based tools will offer a new opportunity to significantly enhance public sector productivity, reducing overwork pressures for public sector professionals and allowing them to better focus on their core tasks. At the same time, the public sector can help new digital services get to scale, benefiting from and strengthening the wider enterprise digital services ecosystem.

## Introduction

The UK has the most advanced digital economy in Europe. This includes strengths in:

- ❖ **Innovation.** The UK's digital economy builds on the UK's wider comparative advantages in services, research, and innovation. This is becoming more important as technologies like AI rise in prominence. The UK is ranked fourth on Tortoise's Global AI Index<sup>1</sup>, and hosts offices of many of the leading frontier AI companies, including Google DeepMind, Anthropic and OpenAI.
- ❖ **Start Ups.** In 2022, UK startups raised over \$30 billion, and the UK had the third largest amount of VC investment behind the US and China.<sup>2</sup> Many of these start-ups grow into new global successes, with the UK home to more tech unicorns than France and Germany combined.<sup>3</sup>
- ❖ **E-Commerce.** Alongside its supply strengths, the UK has also one of the most mature digital markets on the consumer side with widespread adoption in areas like online retail, the gig economy or fintech. The UK has the world's most advanced market for internet shopping, with e-commerce making up 30% of the total retail market.<sup>4</sup>
- ❖ **Inward Investment.** The combination of the UK's supply side strengths and mature consumer market has made it a leading destination for inward investment from global technology companies including Amazon, Google, Meta, Microsoft and Apple. UK based engineers play a key role in developing many of the most popular internet services and products.

In this report, we summarise the wider economic benefits created by the UK's thriving digital economy:

- ❖ First, we produce new estimates of its direct and indirect economic footprint. The digital economy is increasingly one of the UK's most important advantages, and a source of high-paying jobs across the country.

1 <https://www.tortoisemedia.com/intelligence/global-ai/>

2 <https://stagetechn.wpengine.com/tnr2023/#conclusions>

3 <https://www.gov.uk/government/news/uk-tech-sector-achieves-best-year-ever-as-success-feeds-cities-outside-london>

4 <https://www.trade.gov/country-commercial-guides/united-kingdom-ecommerce>

- ❖ Second, we look at the wider benefits created by digital for the wider economy. Increasingly, every company in the economy is a digital one - with the tools created by the sector helping drive increased productivity for businesses and a wider range of lower cost products for consumers.

## The Digital Economy Value Chain in the UK

Digital sectors support billions of pounds of economic activity in the UK and hundreds of thousands of jobs. This is both through the impact of digital businesses themselves as well as the wider economic footprint of these businesses.

In this chapter we examine the impact of the digital economy in the UK. In particular we set out:

- ❖ The contribution of digital sectors to the economy in terms of gross value added (GVA) and jobs (direct economic impacts).
- ❖ The supply chain and employee spending impacts of the sectors (indirect and induced economic impacts).
- ❖ The economic footprint of the digital economy at a regional level.
- ❖ How digital sectors provide a source of well-paying employment.

### 1. Defining the digital economy

To align with government statistics, we define the digital economy in the same way as the Department for Culture, Media and Sport and Department for Science, Innovation and Technology in their digital economy estimates<sup>5</sup>. The digital economy is taken to include the following sub-sectors, which are an aggregation of four digit standard industrial classification (SIC) codes used in official statistics:

- ❖ Manufacture of electronics and computers
- ❖ Wholesale of electronics and computers
- ❖ Publishing activities
- ❖ Software publishing
- ❖ Film, TV, video, radio and music
- ❖ Telecommunications
- ❖ Computer programming, consultancy and related activities
- ❖ Information service activities
- ❖ Repair of computers and electronic equipment

5 <https://www.gov.uk/government/statistics/dcms-and-digital-economic-estimates-monthly-gva-to-june-2023#:~:text=GVA%20of%20the%20included%20DCMS,for%20the%20whole%20UK%20economy>.

Separately, we have also examined the economic footprint of internet retail. This sits outside of the government digital economy definition, but online e-commerce is a good example of digital-enabled trade.

We have examined the size of the digital economy and internet retail sectors in terms of gross value added (GVA) and jobs. GVA is a measure of the value of goods and services produced in an area, industry or sector of an economy. It is the value of the goods and services produced minus the value of inputs into their production (such as raw materials or services such as insurance), which gives a measure of the economic “value added”.

GVA differs from gross domestic product (GDP), which tends to be used to measure the overall size of a country’s economy, as GVA excludes taxes on products (net of any subsidies). By excluding taxes on final products such as VAT, it gives a better picture of the underlying economic importance of specific sectors of an economy. For example, some sectors may have relatively high GDP purely because they are subject to hefty taxes.

## 2. The economic footprint of the digital economy and internet retail

We estimate that digital economy sectors - based on the government definition - contribute £240bn in GVA and support 3.4 million jobs. Online retail is estimated to support an additional £100bn of GVA and about 800,000 jobs, giving a total GVA and jobs footprint of about £340bn and 4.2 million respectively.

This includes:

- ⌘ £227bn of GVA and 2.6 million jobs directly within the digital economy and online retail sectors
- ⌘ £113bn of GVA and 1.6 million jobs along the supply chains of these sectors (the “indirect” economic impact of the sector). For example, this includes the economic impact of digital businesses spending money on logistics, real estate and other professional services.

The direct economic footprint alone stands at 10% of total UK GVA and about one in every 13 (8% of) jobs.

In addition to the above, and excluded from the total footprint, is £179bn of GVA and 2.2 million jobs from employees spending money in the wider economy (the “induced” economic impact of the sector) - for example, the economic impact of employees spending money on housing or in the retail sector.<sup>6</sup>

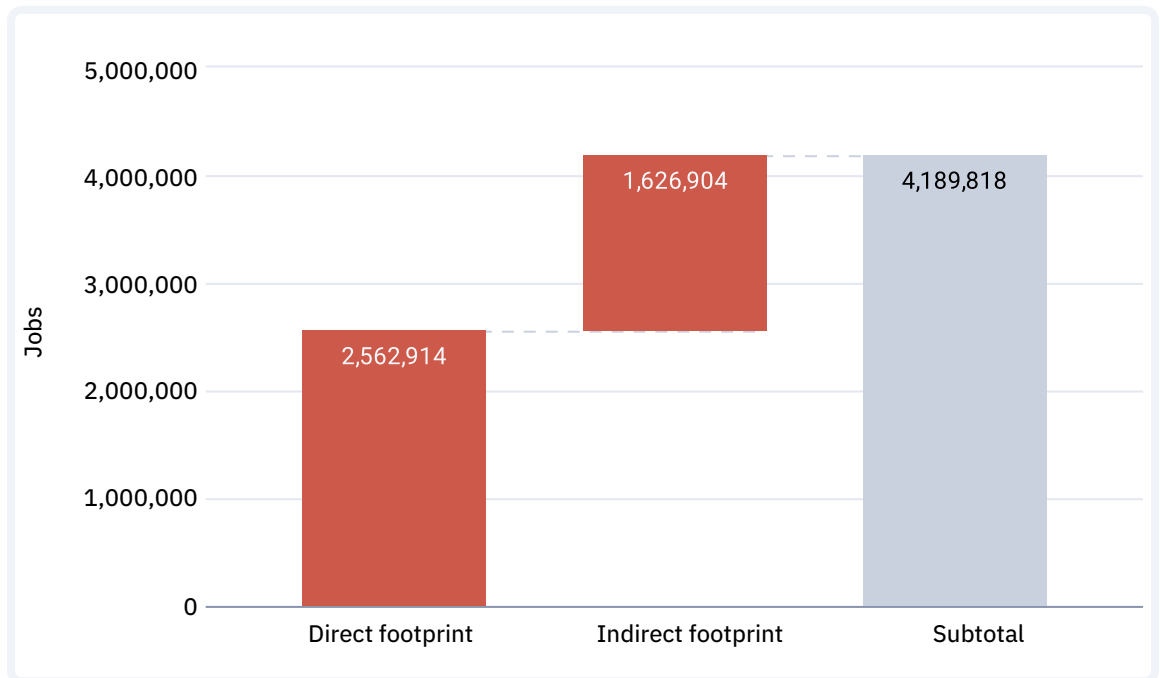
<sup>6</sup> The induced economic impact is excluded from the headline total to err on the side of conservatism, though such impacts are important when conducting more local-level economic analysis.

**Figure 1: Digital sector and online retail – GVA footprint, £ bns**



**Source:** Public First analysis

**Figure 2: Digital sector and online retail – Jobs footprint**



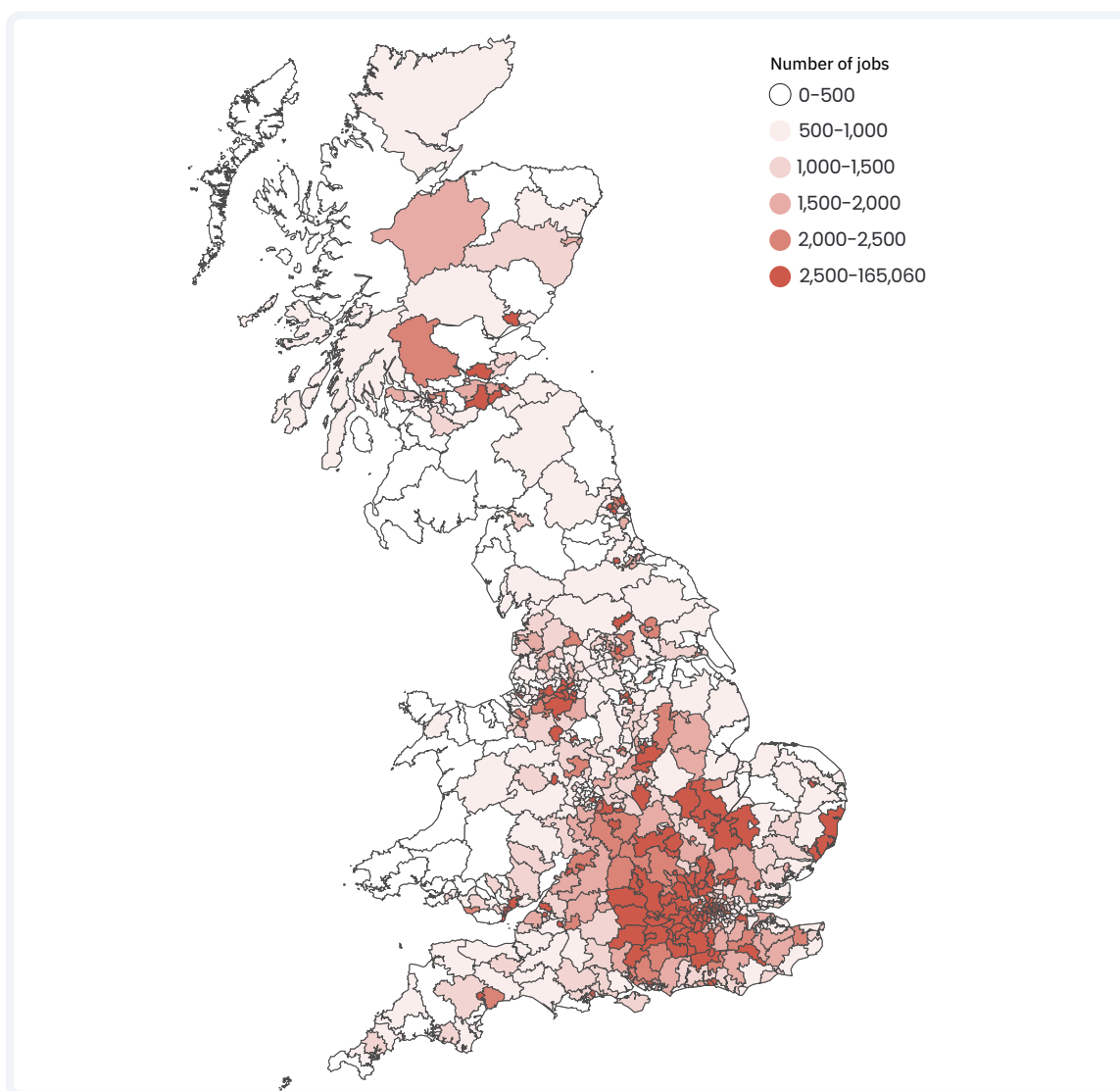
**Source:** Public First analysis

### 3. The regional footprint of the digital economy

The digital economy supports employment across Britain<sup>7</sup>, as shown in official data from the Business Register and Employment Survey. Beyond London, parliamentary constituencies with sizeable digital economies include:

- ✦ Manchester Central - 19,700 jobs
- ✦ Glasgow Central - 18,600 jobs
- ✦ Leeds Central - 17,000 jobs
- ✦ Bristol West - 15,600 jobs
- ✦ Reading East and Reading West - 29,700 jobs across the two constituencies

Figure 3: Jobs footprint of the digital economy

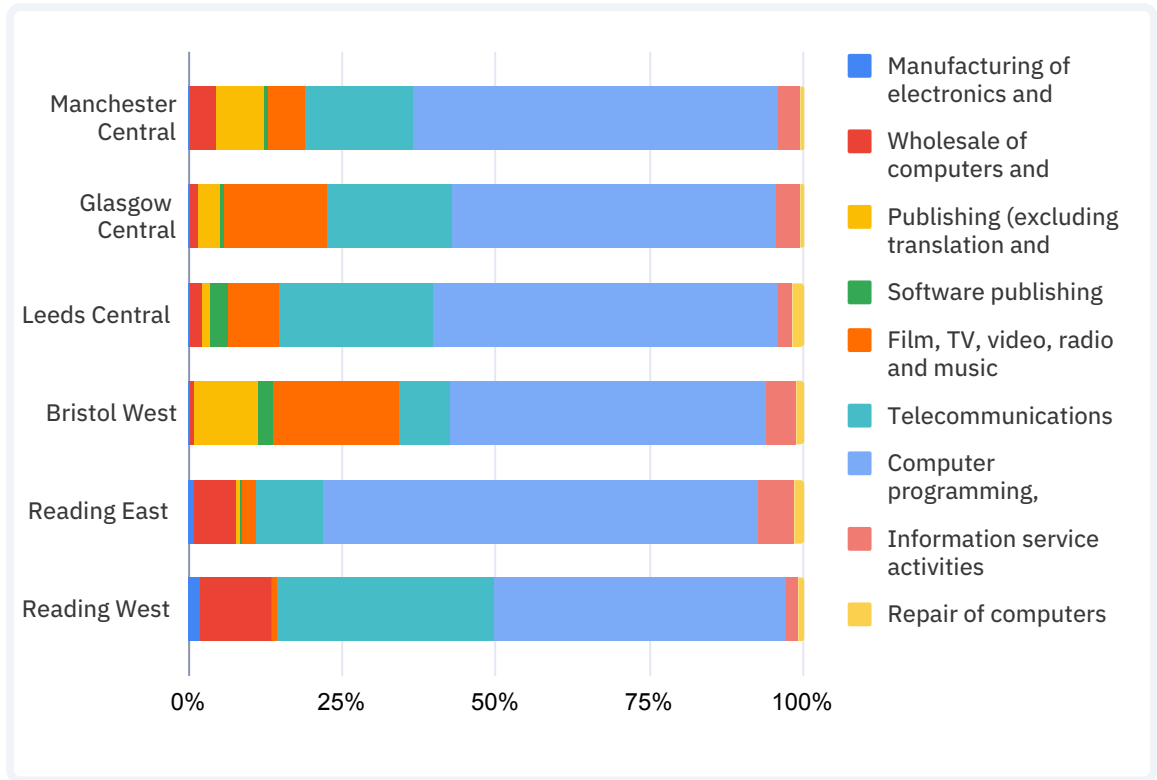


Source: Public First analysis of Business Register and Employment Survey

<sup>7</sup> The Business Register and Employment Survey excludes data for Northern Ireland. Numbers here also exclude jobs associated with online retail, given difficulties splitting this out of local-level statistics.



**Figure 4: Digital economy employment breakdown in selected parliamentary constituencies**

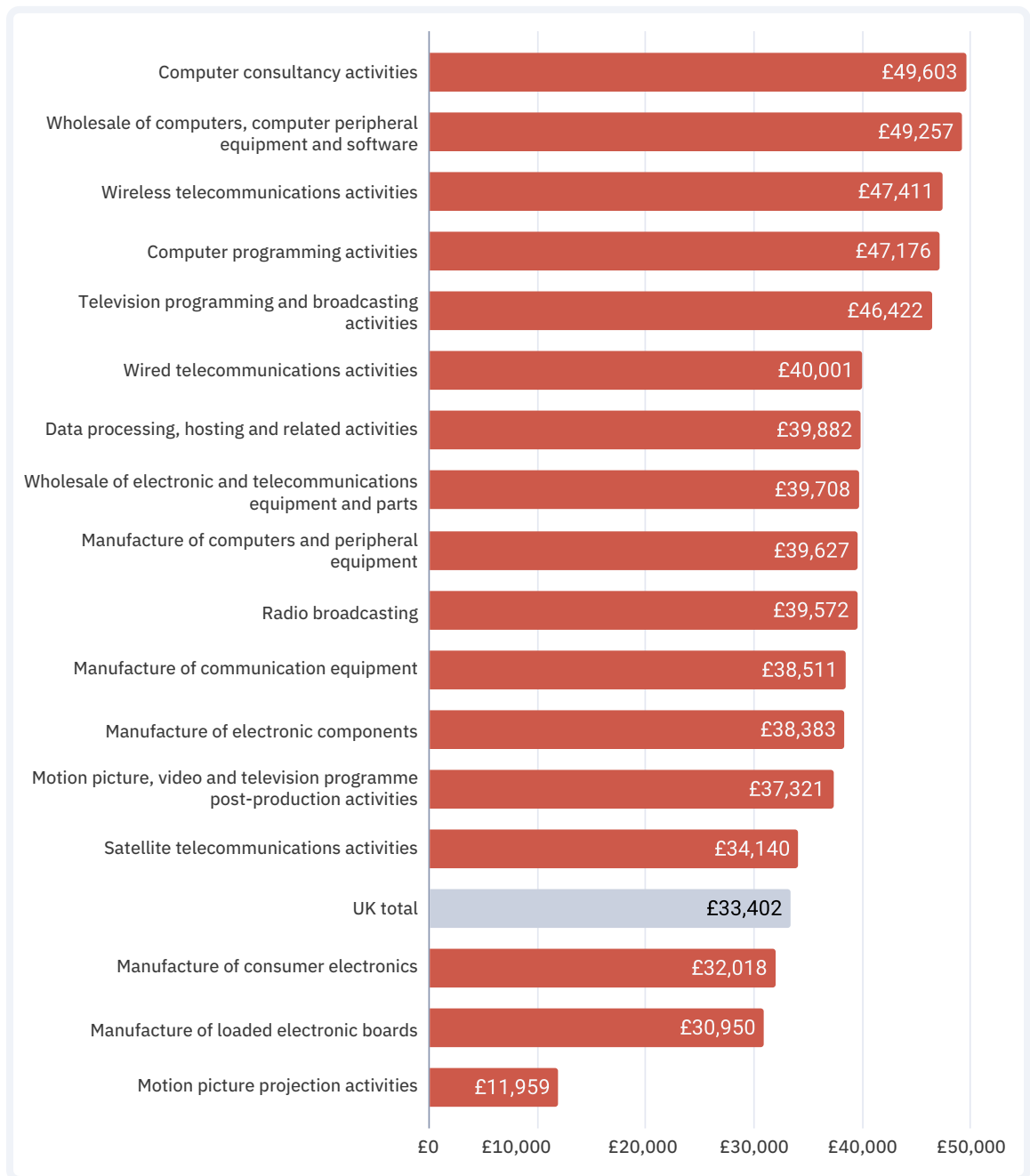


**Source:** Public First analysis of Business Register and Employment Survey

#### 4. The digital economy as a source of well-paying employment

The digital economy is a source of well-paying employment in the UK, with average annual pay standing at about £45,700 per year, over £12,000 (37%) more than the £33,400 seen for the UK as a whole. Pay stands above the national average across almost all sub-sectors of the digital economy. These opportunities can bid up earnings across the labour market, as workers have new alternatives and other sectors raise wages to compete and remain attractive to potential employees. Employers can afford to meet higher-than-otherwise wage expectations due to the improvements in productivity considered in the next chapter.

**Figure 5: Average salary, 2022**



**Source:** Public First analysis of the ONS Annual Survey of Hours and Earnings

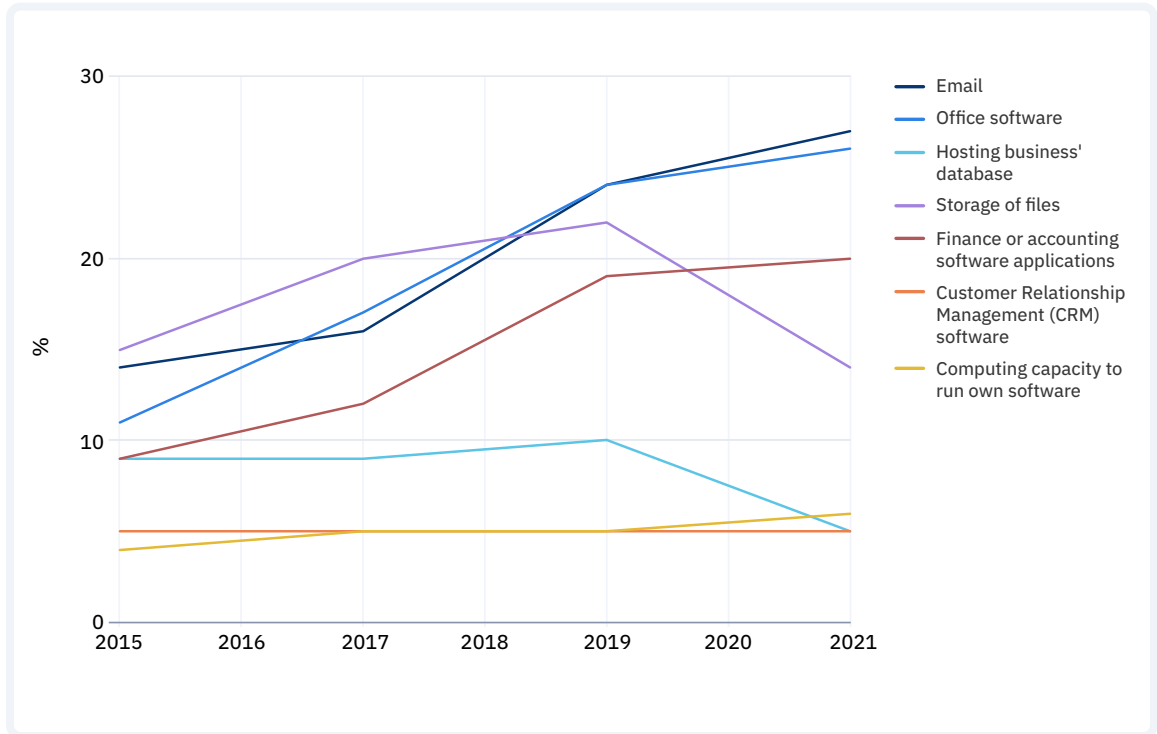
# Enhancing the Productivity of Other Businesses

## 1. Businesses and Workers

While the digital sector incorporates many of the UK’s most dynamic businesses, even more important than its direct impact is the wider impact of the sector: catalysing new business models and higher worker productivity, creating some of the most important products of the last thirty years and increasing the efficiency of the public sector.

Digital software and hardware provides some of the most important tools for workers across the economy. In the most recent ONS data, around two-thirds (67%) of workers use computers with internet access for work.<sup>8</sup> Modern online tools such as search engines, cloud office suites, or customer relationship management (CRM) are increasingly an essential support for workers in their jobs. In a recent poll, a quarter of UK workers said that not having access to a search engine would have a major impact on their ability to do their job or make it impossible.<sup>9</sup>

**Figure 6: Proportion of businesses using different types of cloud tools**



8 Digital Economy Survey, ONS, 2021

9 Google’s Impact in the UK, Public First, 2023

20% of UK businesses are currently using cloud tools for financing or accounting software, 26% for office software and 5% for CRM. A range of estimates have found that these digital tools can have a significant impact on business productivity:

- ∴ The ONS estimates that the use of at least two of enterprise resource planning (ERP), CRM or supply chain management is associated with a 25% productivity premium.<sup>10</sup>
- ∴ Coyle et al (2022) found that “using CRM tended to have a 17.7% larger TFP than non-users, and cloud service users were on average 14.6% more productive than firms not adopting that technology.”<sup>11</sup>
- ∴ Based on firm-level data from European businesses, the OECD estimates that increasing adoption by 10 percentage points for high-speed broadband increases economic productivity by 1.4%, for cloud computing increases it by 0.8% and for CRM by 1.9%.<sup>12</sup>
- ∴ Public First (2020) estimated that cloud computing was supporting at least £37 billion in GVA in the UK, and found that businesses that used more than three cloud tools were twice as likely to be growing as businesses that use none.<sup>13</sup>

Alongside increasing the productivity of businesses, the digital sector has also made it easier for businesses to find, communicate and sell to new customers:

- ∴ **E-commerce.** In 2021, UK businesses made over £459 billion in sales via a website or app, with 11% of businesses making sales through one of these channels.<sup>14</sup>
- ∴ **Digital advertising.** Digital advertising has made it easier for businesses of any size to more precisely target and communicate with relevant customers, where they live in the world. Recent business polling by Public First found that three in five (57%) of SMEs said they had used some form of paid digital advertising in the last year. For every £1 spent on digital advertising, £4.80 is delivered back to the economy in GVA.<sup>15</sup> Beyond its impact for advertisers, this industry also indirectly supports many other companies in areas like media and sport. In total, we estimate that £39 billion in GVA is supported in the UK through businesses that rely on digital advertising.<sup>16</sup>

10 <https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/informationandcommunicationtechnologyintensityandproductivity/2018-10-05>

11 <https://escoe-website.s3.amazonaws.com/wp-content/uploads/2022/03/10100111/ESCoE-DP-2022-06.pdf>

12 Digitalisation and productivity: In search of the holy grail – Firm-level empirical evidence from EU countries, OECD, 2019

13 The Impact of AWS in the UK in 2020, Public First, 2020

14 Digital Economy Survey, ONS, 2021

15 The Digital Dividend, IAB / Public First, 2023

16 The Digital Dividend, IAB / Public First, 2023

- ∴ **Exports.** Around 17%, or £78 bn, of sales that are made via a website or app go to customers that are located outside the UK.<sup>17</sup> Beyond this, many of the the UK’s services exports are currently dependent on digital delivery, with the ONS estimating that ‘potentially digitally delivered services’ made up to three-quarters (75%) of UK exports of services in 2020.<sup>18</sup>
- ∴ **New platforms.** New digital platforms in e-commerce, the gig economy and user generated content have enabled a new generation of microbusinesses or independent contractors to work for themselves. The CIPD estimates, for example, that in 2022 the equivalent of just under half a million people worked in the gig economy.<sup>19</sup> This type of work has been particularly beneficial for those who value flexibility, or want to fit it around other responsibilities: for example, in one poll of gig economy workers, we found that while they were in general more satisfied with their work than the general public, they were three times as likely to value flexibility as the general public.<sup>20</sup>

In the next decade, the increased power and adoption of AI is expected to further boost the productivity of UK businesses. Goldman Sachs, for example, estimates that generative AI could boost labour productivity growth by 1.5 percentage points a year in the UK,<sup>21</sup> while modelling by Public First estimates that generative AI could create over £400 billion in value for the UK economy by 2030.<sup>22</sup>

For workers, AI will allow them to better focus on the more meaningful and creative parts of their work, reducing administrative and unnecessary communication. Recent Microsoft research found that the average Microsoft 365 user now spends over half of their time (57%) communicating in meetings, email or chat, compared to 43% creating in documents, spreadsheets or presentations. While 49% of people told them they were worried AI would replace their jobs, 70% wanted to delegate as much work to AI as possible to lessen their workloads.<sup>23</sup>

How much do these different channels of impact add up? There is currently no overall estimate of the wider economic impact of the digital sector. As a lower bound, however, the contribution of ICT capital alone is on average

17 Digital Economy Survey, ONS, 2021

18 <https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/articles/digitaltradeuk/2020>

19 The gig economy: What does it really look like?, CIPD, September 2023

20 <https://goodwork.publicfirst.co.uk/>

21 <https://www.gspublishing.com/content/research/en/reports/2023/03/27/d64e052b-0f6e-45d7-967b-d7be35fabd16.html>

22 <https://googlesukimpact2023.publicfirst.co.uk/>

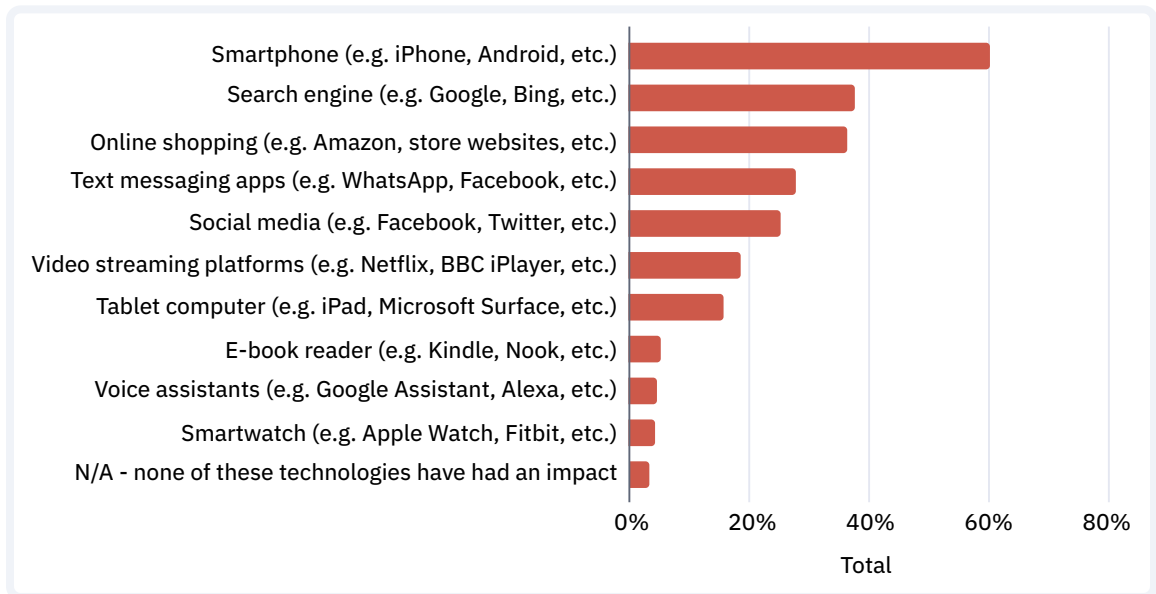
23 <https://www.microsoft.com/en-us/worklab/work-trend-index/will-ai-fix-work>

around 22% of total growth in GDP since 1992.<sup>24</sup> **That is roughly equivalent to £3,000 a year in higher wages for the average worker.**

## 2. Consumers

Beyond its measured impact on GDP and economic productivity, many of the most important impacts of the digital sector have come through the impact its innovations have had on consumers and ordinary life. There is no real non-digital substitute for technologies like the search engine, social media, ride hailing, or video sharing sites.

**Figure 7: Question: Which of the following technologies invented in the last 30 years would you say has had the largest impact on your personal life?**



Many of the most important digital products are offered free of charge to users, making them accessible to people on all different incomes - but meaning that much of their value is not picked up in a traditional measure like GDP. The creation of Wikipedia may have reduced measured economic activity as the sales of traditional encyclopaedias fell, but consumer access to knowledge has significantly increased. On average, Brynolfsson et al (2019) found that the most popular digital services such as search engines had a consumer surplus equivalent to \$17,000 a year.<sup>25</sup> **Replicating a similar methodology for the UK, Public First found in 2023 that digital-ad supported free online services generated £412 billion in consumer surplus for the UK, or the equivalent of £7,400 per adult.**<sup>26</sup>

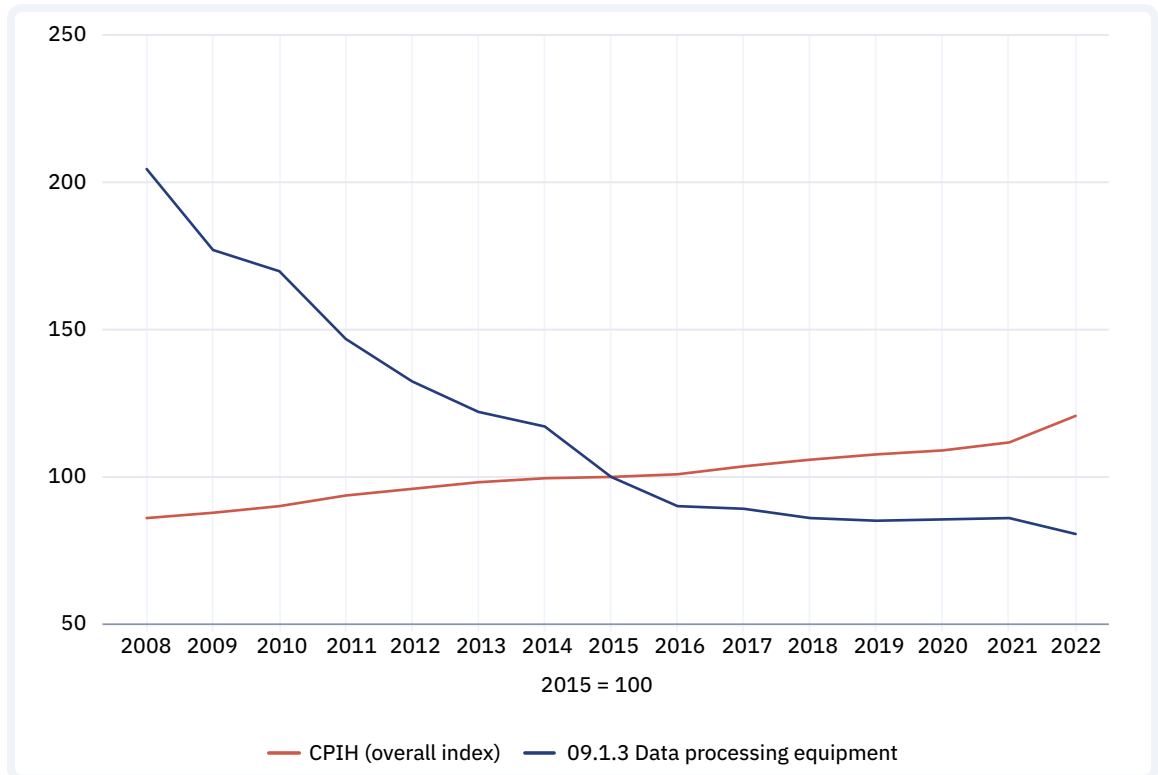
24 Public First calculation based on Total Economy Database, The Conference Board. We take the Conference Board's estimate of total contribution to TFP growth from ICT capital, and work out the overall proportion of UK growth this is equivalent to. We then apply this percentage to current average wages. As explained in the text, this is a lower bound on the impact of ICT and does not include many of the wider productivity improvements driven by ICT or new business models enabled by it.

25 <https://www.pnas.org/doi/10.1073/pnas.1815663116>

26 The Digital Dividend, IAB / Public First, 2023

Repeated studies have found that inflation tends to be lower in the digital rather than the physical economy, helping reduce the cost of living. Goolsbee and Klenow (2019) found inflation online was 1.3 percentage points lower than the overall CPI.<sup>27</sup> In the UK, data from the Adobe Digital Price Index finds falling prices for non-essential items, while inflation for essentials remains below that in the wider economy.<sup>28</sup>

Figure 8:



Another important way digital services such as e-commerce and online marketplaces have increased consumer surplus is by significantly expanding effective choice and the diversity of products available to consumers. Brynjolfsson et al (2003) estimated that for online bookstores, the consumer welfare value from increased choice could be worth 7-10x as much as the gain from increased competition and lower prices.<sup>29</sup> In the UK, we estimate that the consumer welfare uplift from online consumption better matching consumers preferences is worth over £18 billion a year.

27 Internet Rising, Prices Falling: Measuring Inflation in a World of E-Commerce, Austan D. Goolsbee and Peter J. Klenow, 2018

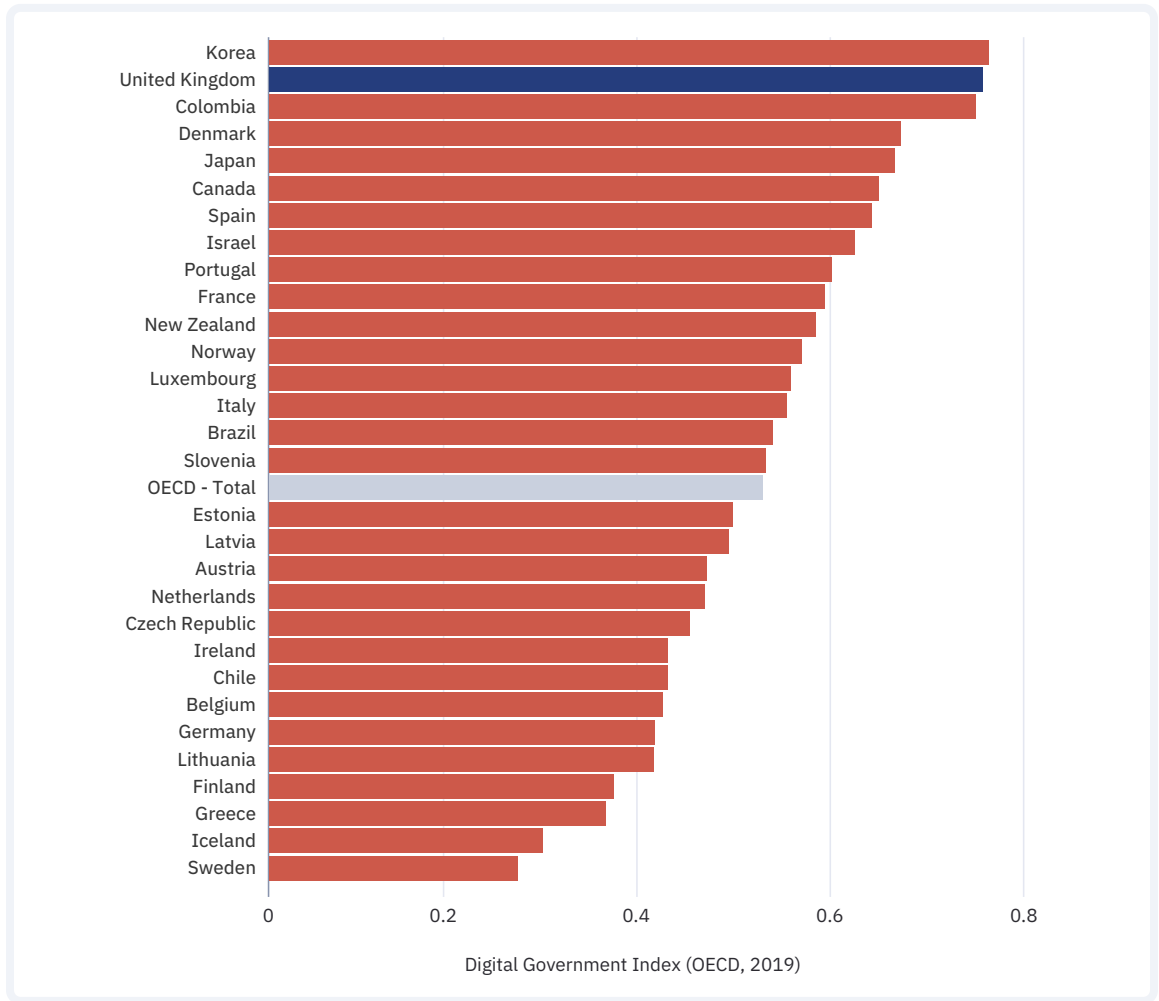
28 <https://business.adobe.com/uk/blog/the-latest/adobe-digital-economy-index-july-2023-uk-data>

29 Consumer Surplus in the Digital Economy: Estimating the Value of Increased Product Variety at Online Booksellers, Erik Brynjolfsson, Yu (Jeffrey) Hu and Michael D. Smith, 2003

### 3. Public Sector

The UK has one of the most advanced digital governments in the world, second only to Korea on the OECD’s Digital Government Index. UK initiatives such as the creation of GDS, GOV.UK, G-Cloud and the UK’s Cloud First policy have been widely copied by other governments internationally. G-Cloud alone, the Government’s digital marketplace for public sector bodies, is estimated to have created over £1.5 billion in commercial benefits for the public sector in its first ten years.<sup>30</sup>

Figure 9:



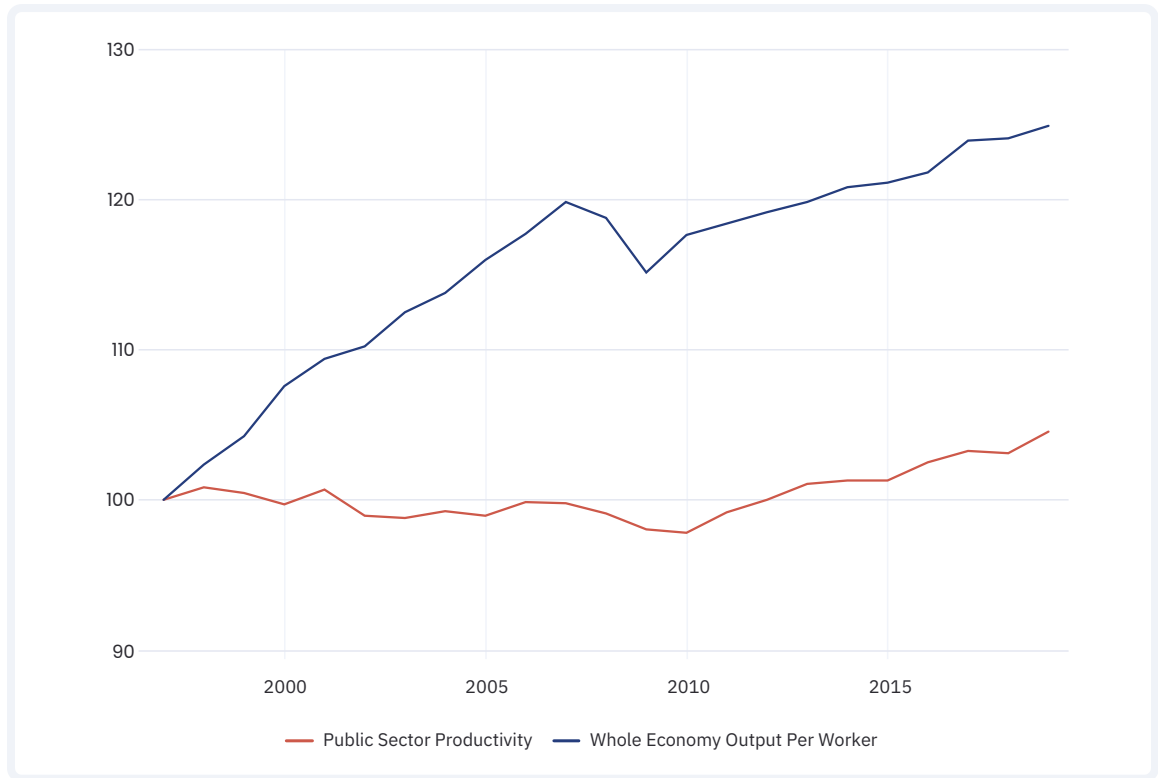
Looking forward, digital technology is expected to play a crucial role in enhancing public sector productivity and ensuring the long term sustainability of the public finances. Over the last 20 years, productivity in the public sector has grown by only around 5%, compared to a 25% improvement in the wider

30 <https://www.crowncommercial.gov.uk/news/g-cloud-computing-initiative-marks-10-year-anniversary>



economy.<sup>31</sup> In June, the Chancellor Jeremy Hunt highlighted that the latest OBR long term predictions were, that without greater productivity growth, for public spending to continue to grow at 2% a year, above the current trend growth prediction of 1.6% a year.<sup>32</sup>

Figure 10:



One key reason that public sector productivity has lagged behind that in the private sector is *Baumol Cost Disease*: public services have been disproportionately concentrated in labour intensive types of work that the state has found much harder to automate and reduce costs in. In the next decades, new AI technologies offer the opportunity to reverse this dynamic in many areas, expanding the types of work that computers can support, reducing the administrative burden and making it easier to detect and treat emerging problems earlier. On one estimate, generative AI could potentially save over 700,000 hours a year in administrative work for GPs and Teachers,<sup>33</sup> reducing overwork pressures for public sector professionals and allowing them to focus on their core job.

31 Public First estimate based on ONS data

32 <https://www.globalgovernmentforum.com/uk-public-sector-faces-productivity-review-us-government-told-to-quicken-pace-of-federal-property-sales-policy-and-delivery-news-in-brief/>

33 Google's Impact in the UK, Public First, 2023

## Appendix I – Methodology

To quantify the economic footprint of the digital economy and internet retail sectors, Public First drew on detailed “input-output supply and use” tables for the UK economy published by the Office for National Statistics. These tables describe the interrelationships between different industry sectors in the economy, and provide a series of “economic multipliers”.

For digital economy sectors, we used direct GVA and jobs footprint data provided by the Department for Culture, Media and Sport and Department for Science, Innovation and Technology in their digital economy estimates. Economic multipliers were then used to translate these direct footprint figures into a wider footprint capturing supply chain (indirect) and employee spending (induced) impacts.

To estimate the direct GVA and jobs footprint of the internet retail sector, we drew on Office for National Statistics data on internet retail sales as a share of total retail sales. This was used to apportion GVA and jobs statistics covering the retail sector as a whole.