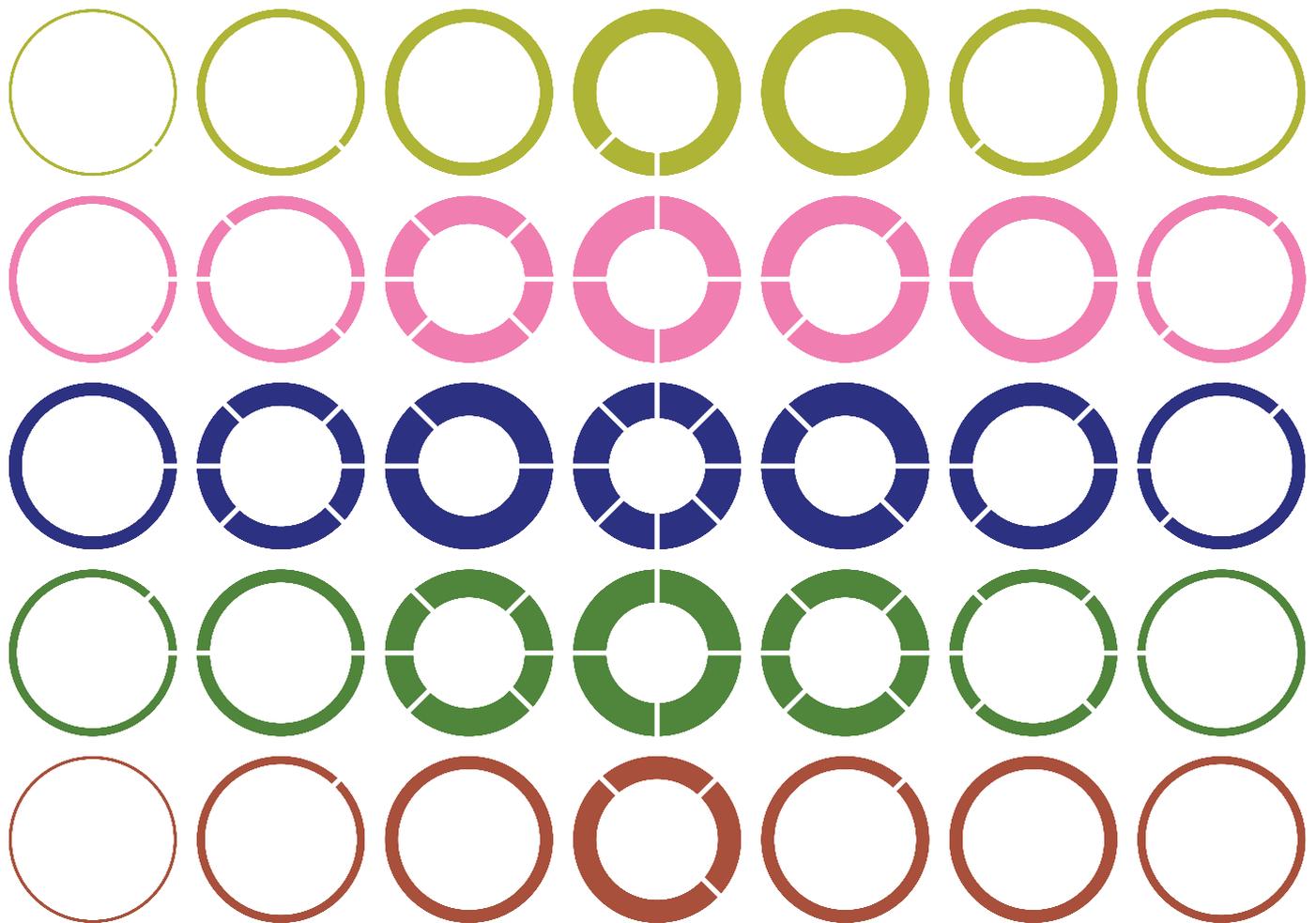

MEASURING THE UK'S DIGITAL ECONOMY WITH BIG DATA



FOREWORD - HAL VARIAN, CHIEF ECONOMIST, GOOGLE

Measuring better

The British mathematician and physicist Lord Kelvin famously said "If you can not measure it, you can not improve it."

In 1948, the post-war British Government badly needed to improve the nation's economy. To help it draw up the right policies for jobs and growth, the Government took a very scientific approach - one of which Lord Kelvin would have been proud. Government statisticians were instructed to count, classify and measure the economic activity of every business in the country. They developed a set of Standard Industrial Classification (SIC) codes and the data they collected was used to shape policy in every aspect of the British economy.

This was a remarkable endeavour. Here was a Government using big data to make smart decisions long before it was fashionable.

However, 65 years and several revisions later, these SIC codes are no longer adequate. Far from providing an accurate picture of the economy, they only serve to show us how much we don't know. One in ten companies in the UK are now classified vaguely as 'other'. One in five have no classification at all.

It is important not just for statisticians, economists and policymakers that we measure the economy accurately but for every one of us who are affected by the major economic decisions that Governments take based on that data.

It is clear we need a new way of measuring the economy and that is what is presented in this report by the National Institute for Economic and Social Research, based on the pioneering big data techniques of Growth Intelligence, a UK company who specialise in tracking

and measuring the economic activities of companies. The richness of Growth Intelligence's data, drawn not just from official tables and accounts but gleaned from more than five billion data points, provides us with a level of detail and insight that statisticians in 1948 could scarcely have imagined.

The digital economy in the UK

Using Growth Intelligence data as a new way of measuring the economy, this report by NIESR focuses on the digital economy and provides us with a transformative view of its scale, geographical spread, revenue growth and employment.

In June 2013, the Government estimated that there were 120,000 businesses in the digital economy, based on the information available in SIC codes. Aware of the limitations of SIC codes, the Government attached a warning to this estimate: 'we may not have an exact picture of the number of businesses in the information economy, or its employment, or the value it brings to the UK economy.'

NIESR's most conservative estimate of the number of digital companies is 269,695. More than double the Government estimate. (Their most generous measure is 471,120 - almost four times the Government estimate.)

The UK is one of the world's strongest internet economies yet the myth persists that it consists largely of tiny dotcom or biotech startups in a few high technology clusters that quickly bubble up and often go bust.

The reality, as this report shows, is that the digital economy has spread into every sector, from architecture firms whose activities have become almost entirely digital to machine tool manufacturers who now use huge online data-processing facilities, such as Hadoop, to monitor every aspect of their processes.

The digital economy has spread into every part of the United Kingdom, not just in London and the South East but throughout the country, with particularly great intensity in places like Manchester, Middlesbrough and Aberdeen.

This report also shows that those firms that are part of the digital economy are, on average, growing faster than those firms that are not.

And while eminent economists on both sides of the Atlantic continue to debate whether technology and the Internet are creating or destroying jobs - driving efficiencies and productivity improvements or simply hollowing out whole types of jobs - this report shows that digital economy companies on average employ more people than those that are outside the digital economy: 23.37 compared to 20.40.

This is a groundbreaking and important report by NIESR not just because it shows that the spread of the digital economy into other sectors is driving growth and jobs throughout the UK but because - for the first time in 65 years - it presents us with a new way of measuring the economy that can only help us to take the right steps to support growth and jobs.

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GROWTH INTELLIGENCE

Growth Intelligence tracks the performance and activity of all companies in the economy in real-time by analysing the digital signatures they emit.

Growth Intelligence sales software automatically brings companies ready to buy together with those ready to sell. Growth Intelligence is led by Tom Gatten, an ex-BBC broadcast journalist and Prash Majmudar an ex-BAE Systems software engineer. They are turning sales from an art into a science and making tens of millions in revenue for their clients as a result. Growth Intelligence boasts Hal Varian, Google's Chief Economist as an advisor.

Visit growthintel.com to find out more.

NIESR

The National Institute of Economic and Social Research (NIESR) is Britain's longest established independent research institute, founded in 1938. The vision of our founders was to carry out research to improve understanding of the economic and social forces that affect people's lives, and the ways in which policy can bring about change. Today, we apply our expertise in both quantitative and qualitative methods, and our understanding of economic and social issues, to current debates and to influence policy. A charity, the Institute is independent of all party political interests and receives no core funding from government.

Visit www.niesr.ac.uk to find out more.

MAPPING THE UK'S DIGITAL ECONOMY

KEY FINDINGS

- The digital economy is poorly served by conventional definitions and datasets. Big data methods can provide richer, more informative and more up to date analysis.
- Using Growth Intelligence data on a benchmarking sample, we find that the digital economy is substantially larger than conventional estimates suggest. On our preferred measure, it comprises almost 270,000 active companies in the UK (14.4% of all companies as of August 2012). This compares to 167,000 companies (10.0%) when the Government's conventional SIC-based definitions are used.
- SIC-based definitions of the digital economy miss out a large number of companies in business and domestic software, architectural activities, engineering, and engineering-related scientific and technical consulting, among other sectors.
- Companies in the digital economy have a similar average age to those outside it. Shares of start-ups (companies up to three years old) are very similar. Given the popular image of the digital economy as start-up dominated, this may be surprising to some. As digital platforms and tools spread out into the wider economy, and become pervasive in a greater number of sectors, so the set of 'digital' companies widens.
- Inflows of digital companies into the economy have always been relatively small, given its sectoral share. However, using our new definitions of the digital economy, inflow levels are substantially higher.
- As far as we can tell, digital economy companies have lower average revenues than the rest of the economy, but the median digital company has higher revenues than the median company elsewhere in the economy. Revenue growth rates are also higher for digital companies. However, these results come from a sub-sample of older, likely stronger-performing companies, so there is some positive selection at work.
- Switching from SIC-based to Growth Intelligence-derived measures substantially increases the digital economy's share of employment, from around 5% to 11% of jobs. Digital economy companies also show higher average employment than companies in the rest of the economy (this reverses when we use conventional SIC-based measures of the digital economy). Looking at median employees per firm, the digital/non-digital differences are always a lot smaller. Our employment results should also be treated with some care, as not all companies report their workforce information.
- The digital economy is highly concentrated in a few locations around the UK: Growth Intelligence software provides a fresh look at these patterns. In terms of raw firm counts, London dominates the pictures, but Manchester, Birmingham, Brighton and locations in the Greater South East (such as Reading and Crawley) also feature in the top 10. Location quotients show the extent of local clustering, which for the UK's digital economy is highest for areas in the Western arc around London, such as Basingstoke, Newbury and Milton Keynes. Areas like Aberdeen and Middlesbrough also show high concentrations of digital economy activity.

CASE STUDY 1 - Communique

Communique Publishing publishes brochures, provides marketing consultancy, communication and web design, e-Marketing and QR coding services. Its digital services include web page design and hosting, domain registration, search engine optimization and on-screen presentations.



Their SIC code is 58190 – 'Other publishing activities'. This means this fast-growing company from East Yorkshire are outside the digital economy defined by traditional methods. Growth Intelligence classified the Communique Publishing as a publisher, but the company's product as Custom Software Development, recognising their role in the digital economy.

Over the last 18 to 24 months, the web hosting and search optimization businesses took off. Simon, CEO of Communique says it was very difficult to find a SIC code represents his business. The fast evolution of Communique's services did not correspond with update to the SIC Code system. The company believes that it is very important to have a correct SIC selection, especially when trading with continental Europe, because it is a direct and easy way to describe what they do.



"I could not find a SIC code that correctly represent the business"
**Simon, CEO,
Communique
Publishing**

CASE STUDY 2 - Kelton Engineering

Incorporated in 1991, Aberdeen-based Kelton Engineering Limited provides 'oil flow measurement' software to the Oil and Gas industry. Clients include Shell, Mobil, and BP. Kelton is currently classified under the SIC Code 82990 – 'Other business support service activities n.e.c.'. Growth Intelligence classified the company in the Oil and Energy sector but recognizes this main product as 'Custom Software Development'. This is an example of a company deeply involved in software development and training, but completely invisible when sorting by SIC Code.



CASE STUDY 3 - Rok Operations

Incorporated in 2004 in Staffordshire, Rok Operations provides server-based text-to-speech technology to website owners.



The technology allows visually impaired website users to hear the website text in their native language or choose a real-time spoken translation. Growth Intelligence classifies Rok Talk in the Translation sector, offering Software Web Application and tagged the company to 'text-to-speech', 'Web accessibility', and 'Human-Computer interaction' tokens. The company's SIC Code is 82990 - 'Other business support service activities not elsewhere classified', meaning you won't find this company looking for digital businesses by SIC code.