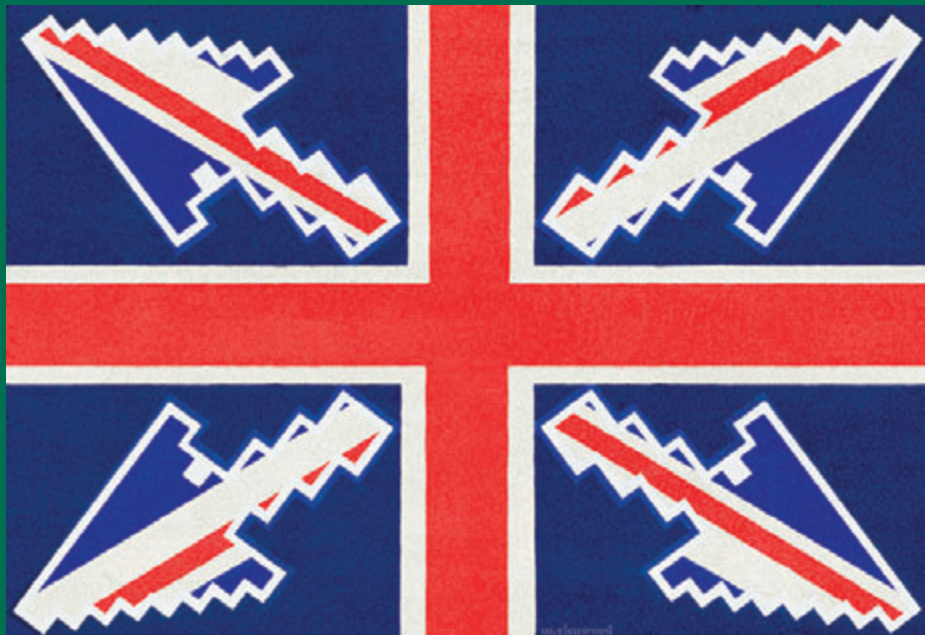


REPORT

The Connected Kingdom

How the Internet Is Transforming the U.K. Economy



THE BOSTON CONSULTING GROUP

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commissioned by



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Preface

The so-called Internet economy is not well understood—a surprising fact considering that the Internet has been analysed and studied to death. But it is difficult to arrive at meaningful estimates of the Internet’s size and growth.

In order to understand the nature and size of commercial activity on the Internet in the United Kingdom, Google UK commissioned The Boston Consulting Group (BCG) to prepare this independent report. The results have been discussed with Google executives, but BCG is responsible for the analysis and conclusions.

Both Google UK and BCG are pleased to present these findings in order to foster a better understanding of how the Internet helps power the U.K. economy.

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Executive Summary

The United Kingdom has embraced the commercial Internet and is now home to the largest per capita e-commerce market and the second-largest online-advertising market globally. But the character of the U.K. Internet economy is not well understood. This report aims to describe and quantify it.

In 2009, the Internet contributed an estimated £100 billion, or 7.2 percent of GDP, to the U.K. economy.

- ◇ This share is larger than that of the country's construction, transportation, or utilities industry.
- ◇ About 60 percent of the Internet economy is driven by consumption, a reflection of the United Kingdom's strength in e-commerce.
- ◇ The United Kingdom is a net exporter of e-commerce goods and services, exporting £2.80 for every £1 it imports.

The significance of the Internet to the U.K. economy is actually greater than these numbers suggest because important economic activities of both consumers and businesses are not directly captured by GDP.

- ◇ Consumers benefit from the Internet by purchasing products offline which they researched online (about £40 billion per year), by saving money through online shopping (about £18 billion per year), and by consuming free online content (about £5 billion per year).
- ◇ Commercial activities not included in GDP calculations include business-to-business e-commerce (about £360 billion per year), online advertising (about £3.5 billion per year), and productivity improvements.

Compared with other developed nations, the United Kingdom has high levels of Internet activity, but this strength masks significant regional differences.

- ◇ On the BCG e-Intensity Index, which measures the depth and reach of the Internet in commerce and society, the United Kingdom performs well in online sales and advertising but not in infrastructure.
- ◇ London is the leading region for Internet use, followed by the South East and East of England. Internet usage is lower in the rest of the country.

While the Internet has disrupted several industries, it has empowered many others, especially small and medium enterprises (SMEs).

- ◇ Proprietary research shows that SMEs which are active online are more successful, growing more quickly and reaching wider markets than their peers.
- ◇ SMEs are selling everything online from tights and tartans to games and advanced e-mail services.

The U.K. Internet economy is likely to grow by 10 percent per year, reaching 10 percent of GDP by 2015.

- ◇ Consumption will be the largest contributor to growth—assuming modest increases in broadband adoption and in consumer acceptance of online shopping.
- ◇ The size and nature of this growth—and the winners and losers which result—will depend on the actions of businesses, governments, and individuals.



The U.K. Internet Economy

A Snapshot

Twenty-five years ago, the first .co.uk address was quietly registered. A decade later, the commercial Internet engine was roaring, and the United Kingdom was quickly emerging as a leading force.

Today the country is the largest per capita e-commerce market and second-largest online-advertising market in the world, after the United States. The United Kingdom may not be home to Internet giants such as Facebook, Google, Yahoo!, or eBay, but it has produced Sir Tim Berners-Lee, the father of the World Wide Web, and a solid base of savvy online consumers and companies whose success is driven by their use of the Internet.

A wide range of companies are actively exploiting the Internet for commercial advantage, including retailer John Lewis—which reported a 36 percent increase in online sales in the first half of 2010—and UK Tights, a family operation which sells hosiery online.

But how big is the United Kingdom’s Internet economy? Remarkably, that question has not been widely studied, perhaps because the answer is not easy to uncover, let alone explain. It is nonetheless an important question for policymakers and business executives to address.

By putting a value on the U.K. Internet economy and exploring its commercial character, we hope to provide a context for business executives and government officials to make better and more informed strategy and policy decisions.

In order to set the stage for that broader discussion, we first discuss how companies and consumers in the United Kingdom use the Internet.

Active and Adventurous Internet Users

The United Kingdom has become a power user of the Internet. More than 19 million of its 26 million households have an Internet connection. Broadband penetration has more than doubled since 2005.¹

Users are increasingly active and adventuresome on the Internet. The average U.K. user spent nearly an entire 24-hour day on the Internet in April 2010, an increase of 65 percent in just three years. Close to one-quarter of that time was devoted to social-networking sites and blogs, double the time spent three years ago. Indeed, about 25 million U.K. consumers are members of Facebook.

The Internet is gaining on television as the most popular media activity. Among 16- to 24-year-olds, more time is spent on the Internet than in front of the television. Consumers rank sending and receiving e-mail and text messages, making mobile phone calls, and general Internet use as more important than watching television.

Online Shopping

U.K. residents are active and avid online shoppers. About 62 percent of adults, or 31 million people, have bought goods or services online in 2010. Collectively, they spent

1. The statistics in this chapter come from the Interactive Advertising Bureau Europe; the Interactive Media in Retail Group; the UK Online Measurement Company/Nielson survey, May 2010; U.K. Office of Communications (Ofcom), *The Communications Market Report 2010*; Martha Lane Fox, *Manifesto for a Networked Nation*, a report commissioned by the U.K. government; and the Oxford Internet Institute, July 2010.

about £50 billion in 2009 on goods and travel, or about £1,660 each. The clothing and sporting-goods category is the most popular, both overall and among women. For men, it's film and music. Half of all travel is booked online. Meanwhile, 38 million U.K. consumers have accessed eBay, while 7 million have sold an item on the auction site.

Mobile Access

Nearly one-third of U.K. Internet users, or 31 percent, have accessed the Internet on their mobile phone, up from 23 percent in 2009. That share rises to 44 percent among users aged 16 to 24. Facebook is the most popular U.K. mobile Internet site.

The popularity of the iPhone and other smartphones is fuelling this rapid rise in mobile data traffic, which tripled from the fourth quarter of 2008 to the fourth quarter of 2009. Over half of smartphone users say they frequently access the Internet on their phone. By the second quarter of 2010, 12.8 million smartphones were in use—more than a quarter of all mobile phones.

Tablets, such as the iPad, will likely be the next popular device for accessing the Internet. While U.K. consumers lag U.S. consumers in their awareness of tablets and e-readers, 20 to 40 percent of those surveyed in a recent BCG survey said they were interested in buying one of these devices in the next year.

Exclusion from the Internet

Access to the Internet, however, is not universal in the United Kingdom. One-fifth of the adult population—around 9 million people—have never gone online. These people tend to live in rural areas at a distance from London. Although nonusers are concentrated in the lower income groups, cost is only the fourth-most-cited explanation for not using the Internet, after lack of a reason to go online, lack of skills, and lack of desire.

About 60 percent of those aged 65 or older have never used the Internet. Nearly two-thirds of nonusers are in this age group. Progress, however, is being made. More than half of the 1.9 million new Internet users over the past year were aged 50 or older. One of the challenges for the United Kingdom—and for all nations—is to bring this final fifth of the population into the Internet age.

The Internet's Ripples

GDP and Beyond

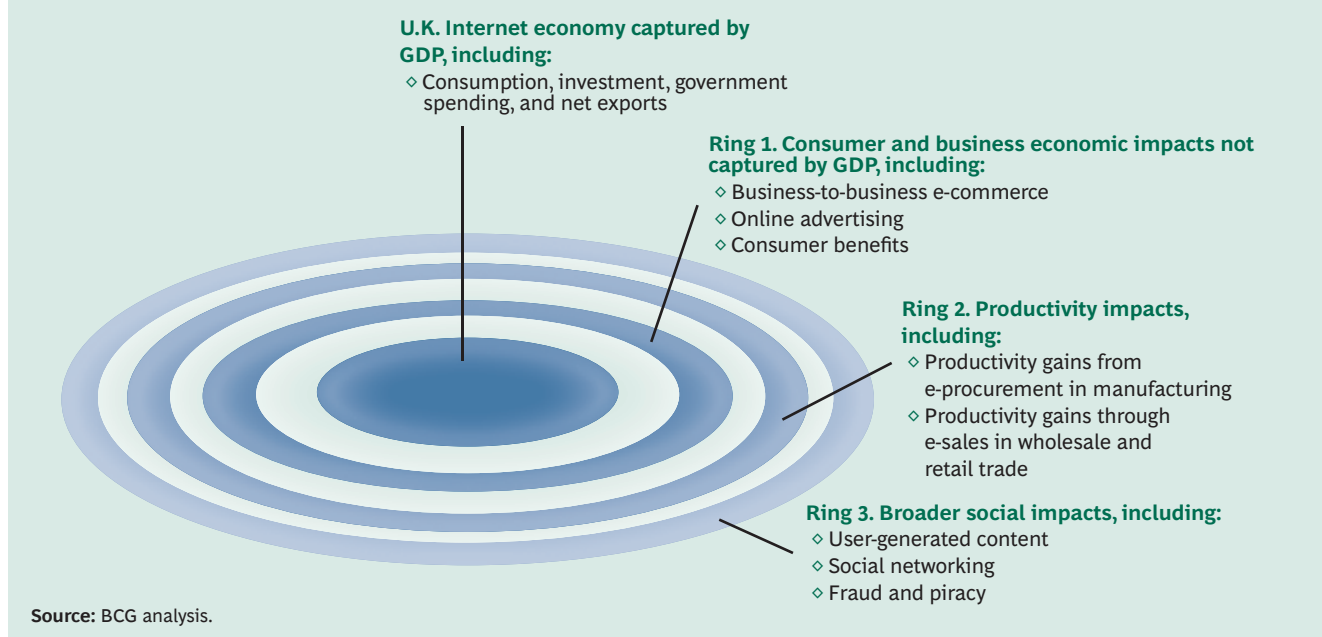
The Internet's influence on commerce and society in the United Kingdom is large, palpable, and growing. But measuring that influence is difficult. There are visible and easy-to-measure indices, such as online sales, but also less obvious factors, such as productivity gains, which defy easy quantification.²

We have broken down the Internet's economic impact into four key parts. The measurable transactions include digital transactions—downloads of a movie on LoveFilm, for example—and transactions which originate on the Internet but terminate in the world of trucks and planes,

such as groceries bought on Tesco.com. These transactions make up the bulk of the inner circle shown in Exhibit 1. The remainder of this circle comprises investments, government spending, and net exports.

2. It is frequently difficult to calculate the economic impact of a general-purpose technology such as the Internet which transforms and pervades commerce and society. The steam engine, electricity, and the internal combustion engine presented similar challenges. While it may once have made sense to ask about the size of the "electricity economy," that question is now moot. Electricity is fully woven into the fabric of the developed economies. The Internet is not yet as ubiquitous as electricity, but the analogy illustrates the difficulties of defining and sizing the Internet economy and describing its growth.

Exhibit 1. Only Some of the Internet's Impacts on the U.K. Economy Are Captured by GDP



In addition, the Internet creates ripples which move through the rest of the economy. These effects may be measurable, but they are not included—or they are only indirectly reflected—in GDP calculations. For example, the Internet has helped launch new types of businesses and bring down transaction costs. It unites buyers and sellers who would otherwise be unlikely to transact, it speeds procurement cycles, and it enables consumers to rapidly compare prices. We have divided these “beyond GDP” effects into three parts, shown in the three outer rings in Exhibit 1.

Ring 1 covers the significant economic impacts of the Internet from three sources: businesses-to-business e-commerce; online advertising; and various consumer benefits, such as the *consumer surplus*—the difference between what consumers are willing to pay for a product and what they actually pay.

Ring 2 covers the impact of the Internet on productivity across the manufacturing and service sectors. For example, the Internet has allowed Arena Flowers, a company profiled later in this report, to automate and control its

supply chain, including ordering, stocking, transport, delivery, and customer care.

Ring 3 covers social effects of the Internet which are simply not measurable, such as sharing user-generated content, using social-networking sites, and staying connected with faraway friends and family through video chats.

The measurable size of the U.K. Internet economy in 2009 was £100 billion, or about 7.2 percent of GDP.

Internet GDP Calculated

The measurable size of the United Kingdom’s Internet economy in 2009 was £100 billion, or roughly 7.2 percent of GDP. (See Exhibit 2.) Its share is larger than that of the country’s construction, transportation, or utilities industry and is slightly smaller than that of the financial industry. (See Exhibit 3.) These comparisons are offered in order to give a sense of the scale of the Internet’s effects rather than as an absolute barometer of economic performance. (See the sidebar “Three Ways to Skin an Economy.”)

Despite its limitations, this £100 billion figure conveys the Internet’s economic punch—and its rapid evolution. Ear-

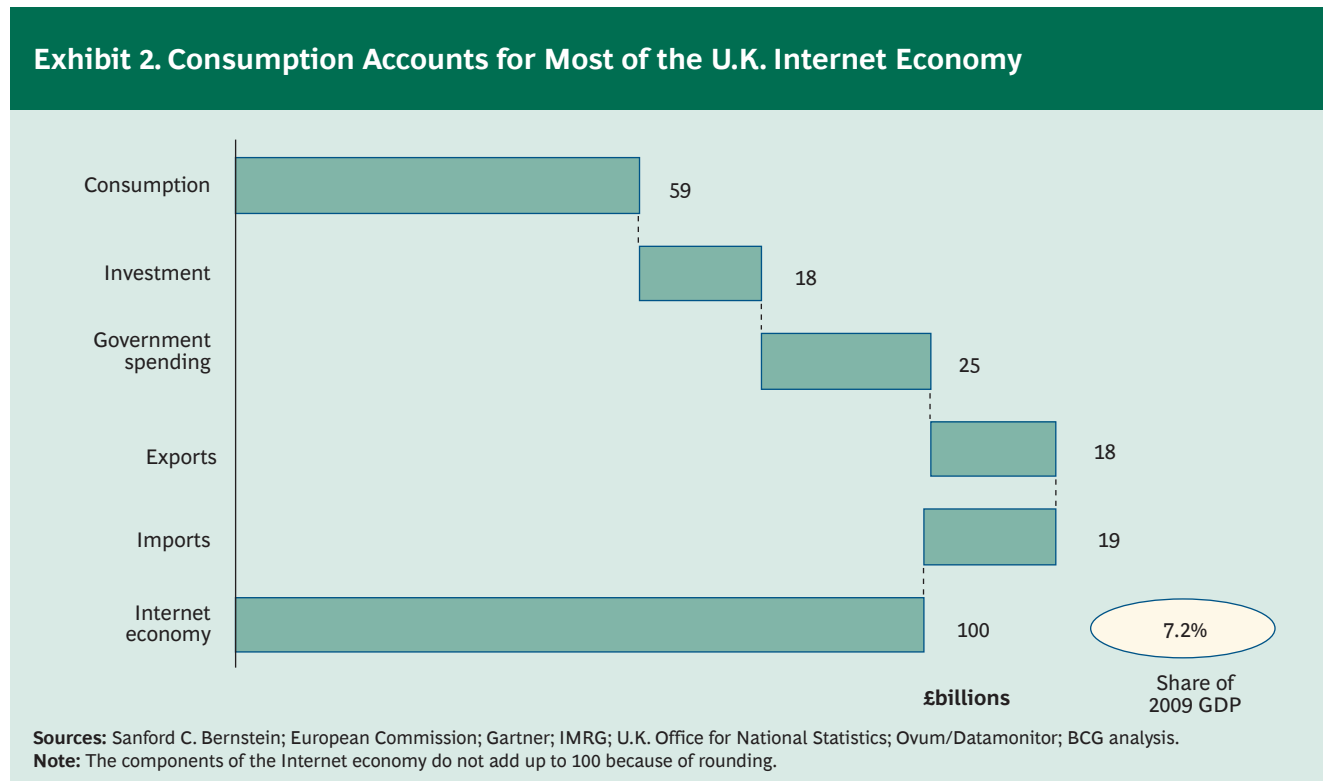


Exhibit 3. If the Internet Economy Were a Separate Sector, It Would Be the United Kingdom's Fifth Largest



Sources: U.K. Office for National Statistics; BCG analysis.

Note: The size of the various sectors and the size of the Internet economy were calculated using different GDP methodologies, so direct comparisons are not precise. For example, the Internet economy includes slices of other sectors.

¹This sector includes rents and the imputed cost of home ownership, in addition to business activities and business services.

²This sector includes telecommunications, so there is a large overlap with the Internet economy.

ly in the century, during the funny-money dot-com era, the Internet helped produce tremendous wealth for a few shareholders but not much revenue. Today the Internet is helping to strengthen the U.K. economy.

Specifically, nearly 60 percent of the country's Internet economy consists of consumption, comprising two main parts: consumer e-commerce (about £50 billion, up from just £2 billion in 2001) and consumer spending on Internet service providers and devices to access the Internet (about £10 billion). In other words, U.K. consumers spend significantly more money online than they do getting online. The remaining 40 percent of the Internet economy is driven primarily by government spending and private investment in Internet-related technology.

Exports are an important—although hidden—force in the Internet economy. In 2009, the United Kingdom exported £9.5 billion in e-commerce goods while importing £3.4 billion, a ratio of 2.8 to 1—the reverse of what was happening in the rest of the economy. This strength in e-commerce, however, does not show up in the figure for overall net exports, because it includes net imports of

information and communications technology (ICT) equipment.

Beyond GDP: Consumer and Business Economic Impacts

Business-to-business e-commerce, online advertising, and a variety of consumer benefits are all measurable, even if they do not count on a GDP scorecard.

Business-to-Business E-Commerce. Business purchases over the Internet and other electronic channels exceeded £360 billion in 2008, representing 23 percent of the total purchases of nonfinancial businesses, according to the U.K. Office for National Statistics (ONS). To avoid double counting, we did not include these transactions in our estimate of GDP, since the final sale of a product includes the value of these intermediate transactions.

Mimecast, for example, a London-based cloud provider of e-mail services to businesses, generated more than £13 million in revenues last year. These revenues—and those

Three Ways to Skin an Economy

There are three methods of calculating GDP, and none of them was designed with the Internet in mind.

The *output or production method* measures the value created through the production of goods and services. The *income method* measures total income earned by individuals and companies. The *expenditure method* measures total spending on finished goods and services.

The output method is theoretically the best way to measure the Internet's contribution. It is the approach used to calculate the contributions of most traditional sectors in the economy. But using this method would have required that we look at every transaction of every good or service produced in the U.K. economy and decide whether it was "online" or "offline"—which is not practical with current data.

The income method has its own Achilles' heel in the many assumptions that would have to be made about the share of the income of traditional companies to be allocated to the Internet and the share of the income of multinational companies to be allocated to the United Kingdom. Those assumptions would call into question the accuracy of the final calculation.

Although the expenditure method is also imperfect, we chose to use this approach because it reveals the contributions of consumers, businesses, and government entities to the Internet economy and approximates the sum of the online components of all the other sectors. The expenditure method is built on four pillars.

- ◇ *Consumption*: goods and services bought by households in the United Kingdom over the Internet and consumer spending on Internet access, both payments to Internet service providers and the cost of the relevant portions of devices
- ◇ *Investment*: capital investment by telecom companies related to the Internet as well as Internet-related private investments in information and communications technology (ICT)
- ◇ *Government spending*: public ICT spending
- ◇ *Net exports*: online goods and services and ICT equipment exported less comparable imports

It is important to be clear about the assumptions folded into the Internet's £100 billion contribution to the U.K. economy. Most notably, the full value of goods sold online is counted because it gives a sense of the importance of the Internet as a retail channel. Most online transactions, of course, terminate in the physical world, so they are not pure online transactions, but many of them might not have taken place without the Internet as a catalyst. Data on the "online" value generated at each link in the value chain is unavailable and estimating it would imply a false level of accuracy. (See the Appendix for more detail about the underlying assumptions.)

of other companies which enable the operation of the Internet, such as PayPal, a payments provider, or Akamai, a company which speeds content delivery—are not included in our GDP estimate.

Online Advertising. Like business-to-business transactions, online advertising revenues are not included in our GDP calculations, because they do not represent final sales. Online advertising totalled £3.5 billion in 2009, or 30 percent of all U.K. advertising spending, up from just 11 percent in 2005.

This advertising helps support the offering of free goods and services on the Internet. It also helps smaller businesses compete against larger competitors, a subject we

touch on in a later chapter. For example, UK Tights, the hosiery company mentioned earlier, has built a £1 million business out of a remote warehouse through pay-per-click advertisements which target consumers interested in purchasing stockings, socks, and suspenders.

Consumer Economic Benefits. Many benefits to consumers which are generated by the Internet are also left out of GDP, such as the value of goods researched online but purchased offline, the cost savings from shopping online, and the consumer surplus which results from accessing free content.

We estimate the *value of goods and services researched online but purchased offline* at £40 billion in 2008, nearly the

size of the consumer e-commerce market.³ The retail, automotive, and travel sectors represent 71 percent of this consumption. Shoppers make better decisions and often save time and money when they conduct research online, which allows them to compare prices and read reviews. For example, many consumers prefer to research mobile phones and services online but to make their purchases at a store. Vodafone recently estimated that online advertising and research generated 1.75 new service connections purchased at a store for every connection purchased online.

Cost savings from online shopping can be substantial, even when shipping and handling costs are included. In a recent survey conducted by the ONS, 60 percent of households said lower prices were key reasons for shopping online. We estimate the cost savings from shopping online across a range of product categories at about £18 billion, or close to £1,000 per online household annually.⁴ Most of these benefits are currently being captured by high-income households, which are more likely to go online and to spend more money there.

We conservatively estimate the *consumer surplus from free online content* to be about £5 billion annually, or twice what consumers pay to access the Internet.⁵ According to the previous U.K. government's *Digital Britain* report, 70 percent of people with home broadband services say they could not live without it. They value the Internet more highly than their mobile phone, landline, or digital TV.

Beyond GDP: Higher Productivity

It seems intuitive that the Internet should increase productivity by lowering transaction costs, accelerating and simplifying business processes, and improving the flow of information. But it takes time for these benefits to show up. The full impact of the steam engine was not fully enshrined in productivity statistics until nearly 100 years after its invention.

Although academics love to debate it, this is not an academic issue. As Paul Krugman, the Nobel laureate in economics, has written, "Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost

entirely on its ability to raise its output per worker." Small differences in productivity growth compound over time and boost economic performance and the standard of living.

Recent research conducted by the statistical offices of 13 European Union countries, including the United Kingdom, examined the impact on productivity of three key variables related to the Internet: e-procurement, e-sales, and the percentage of employees connected to broadband.⁶ The largest productivity gains were generated through e-procurement in the manufacturing sector, through e-sales in the wholesale and retail trade sectors, and through broadband adoption in the business and financial services sectors.

Manufacturing. A 10 percent increase in e-procurement, the research found, leads to a 2.6 percent increase in productivity, which—given the compounding effect—is sizeable. This finding argues in favour of further integration of e-procurement into supply chain management and the development of e-invoices and sophisticated inventory information systems.

Wholesale and Retail Trade. A 10 percent increase in e-sales leads to a 3.1 percent increase in productivity. But in this sector, an increase in e-procurement appears to diminish productivity, at least in the short term, as thin wholesale and retail margins are squeezed.

Business and Financial Services. Giving employees access to high-speed Internet and e-procurement boosts

Savings from shopping online is about £18 billion, nearly £1,000 per online household annually.

3. This value is derived from our estimate of the proportion of people who purchased a product offline after researching online in 36 product categories and the average spending per person in each category. The proportion of customers who research online but purchase offline comes from a survey of 2,000 households for the IAB Europe/Google Consumer Commerce Barometer.

4. Cost savings were estimated across 15 product groups and then applied to household spending by product group for each income group and by the percentage of households in each income group likely to be online.

5. The estimate of what consumers would be willing to pay for selected online content, over and above basic e-mail and Web browsing, is based on a survey by Entertainment Media Research of about 1,600 U.K. consumers which asked them to make hypothetical tradeoffs.

6. Eurostat, *Information Society: ICT Impact Assessment by Linking Data from Different Sources*, 2008.

productivity in these sectors. A 10 percent increase in the number of employees using fast broadband raises productivity by 0.9 percent, and a 10 percent increase in e-procurement raises productivity by 1.2 percent. Knowledge management and customer relationship management systems are probably driving the improvements in these businesses.

Beyond GDP: Broader Social Benefits ... and a Few Concerns

The writer Clay Shirky coined the phrase “cognitive surplus” to describe the creativity and knowledge unleashed by the Internet and made available for public use. By his calculation, it took 100 million hours of human thought to create Wikipedia—roughly equivalent to the amount of time U.S. viewers spend watching television commercials in a single weekend.

A creative form of cognitive surplus is provided by London-based mydeco, which allows consumers to design rooms using sophisticated 3-D online tools. Mydeco makes money on advertisements and commissions from stores whose goods are displayed on the site. But customers frequently offer their designs to one another for free, and the value of this service is not captured in GDP.

The distribution of content, too, has been revolutionised by the Internet. Consumers themselves have created useful content, not just in such obvious places as Wikipedia but also through product reviews, special-interest blogs, and social-networking sites. Crowdsourcing has helped generate news reports, traffic updates, and other collec-

tive intelligence. Finally, the Internet has brought the world closer together through e-mail, IP telephony, instant messaging, and social networking.

But the Internet can foster bad intentions in the same way that it fosters good ones. For example, the most recent Microsoft Security Intelligence Report estimates that 97 percent of e-mails globally are unwanted. Some consumers are turned off by intrusive advertisements and commercial messages. The exchange of information is much easier, cheaper, and faster on the Internet, but that also facilitates the distribution of illicit content, such as pornography and pirated video and music. Identity theft and fraud are increasing, too. The Interactive Media in Retail Group (IMRG) estimates that online fraud costs the United Kingdom £3.5 billion and affects more than 3 million Britons annually. Banks and card companies are taking preventive measures, but it is an unending game of cat and mouse.

These risks are not deterring the public from using the Internet, however. According to a study by the Oxford Internet Institute, only 12 percent of those who have stopped using the Internet cite privacy concerns as a reason, and only 9 percent cite spam and viruses.



Internet Intensity

Although the Internet is global, not all nations have embraced it equally. Some, such as South Korea, have built advanced broadband infrastructures. The Nordic nations, in particular, have excelled at bringing businesses, government, and consumers to the Internet. But others are falling behind.

On the Global Stage

How well does the United Kingdom fare compared with other countries? To answer that question, we created the BCG e-Intensity Index to measure the depth and reach of the Internet in commerce and society among the nations of the Organisation for Economic Co-operation and Development (OECD).⁷ The United Kingdom does well among OECD nations, scoring similarly to the Netherlands, Norway, and Finland and better than Germany, the United States, and France. Among large European economies, it has the highest score. (See Exhibit 4.)

The index looks at three measures of Internet activity:

- ◇ *Enablement*: how well built is the infrastructure and how available is access?
- ◇ *Expenditure*: how much money are consumers and businesses spending online on e-commerce and online advertising?
- ◇ *Engagement*: how actively are businesses, governments, and consumers embracing the Internet?

The index balances enablement (which has a 50 percent weighting) against the two measures of usage: expendi-

ture and engagement (each with a 25 percent weighting). Despite its assumptions and the inherent margin of error, such an index does help to show a country's strengths and weaknesses, especially at the sub-index level. (See Exhibit 5.)

Enablement. The United Kingdom ranks in the middle of the pack on the enablement sub-index, which measures broadband adoption by consumers and businesses, smartphone adoption, and average download and upload speeds. Slow broadband speeds dragged down the U.K. score. In a ranking of 23 OECD nations on broadband speed, the United Kingdom finished near the bottom, at 17. Only 15 percent of U.K. subscribers have connection speeds above 5 megabytes per second, compared with 65 percent in South Korea, 60 percent in Japan, 40 percent in most of the Scandinavian nations, and 25 percent in the United States. Average monthly access costs, however, are low, at £14.

Expenditure. The United Kingdom emerged as the top nation on the expenditure sub-index, ahead of Denmark, the United States, and Germany. This yardstick measures business-to-business and business-to-consumer online sales and spending on online advertising. As the country with the highest per capita spending online, the United Kingdom is a clear leader in this part of the Internet commercial scene.

Engagement. The United Kingdom received a moderate score for engagement across the three components of this sub-index: Internet adoption by businesses, by consum-

⁷ We were not able to collect adequate data to include Chile, Mexico, Slovenia, and Turkey in the index. See the Appendix for more detail on the construction of the index.

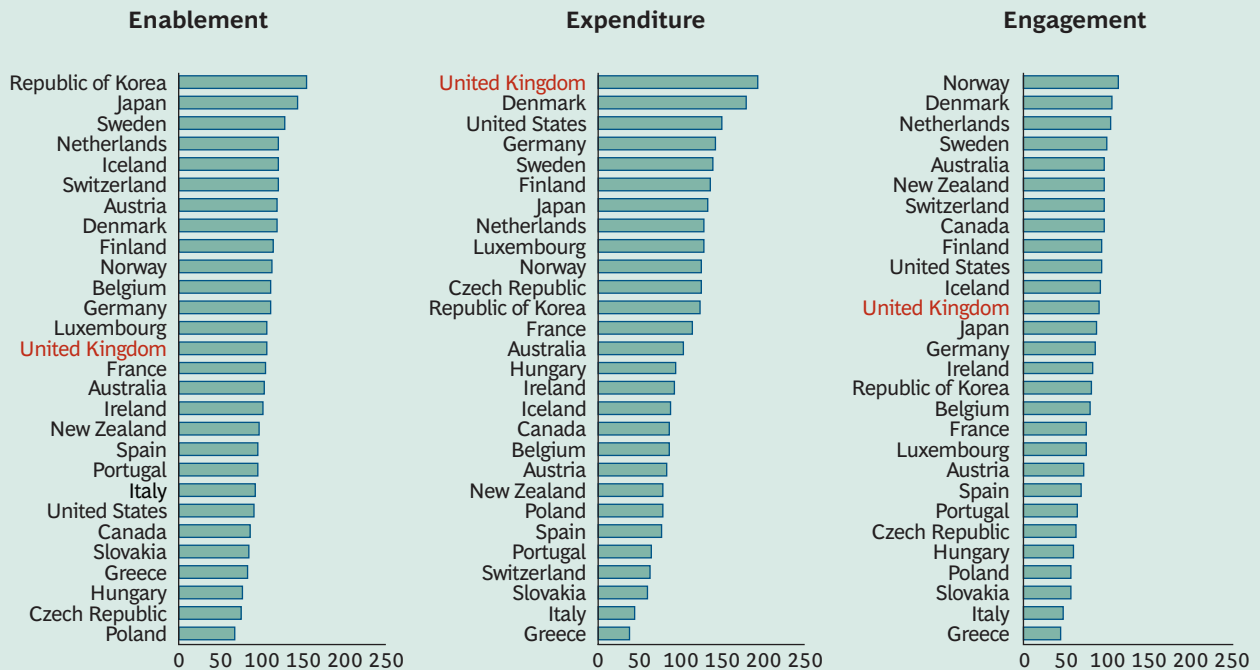
Exhibit 4. The United Kingdom Finishes High on the BCG e-Intensity Index

Country	Score	Country	Score
Denmark	140	Austria	103
Republic of Korea	139	Belgium	102
Japan	138	Switzerland	101
Sweden	134	Ireland	99
Netherlands	129	New Zealand	95
United Kingdom	128	Canada	91
Norway	125	Spain	86
Finland	124	Czech Republic	83
Germany	120	Portugal	80
Iceland	111	Hungary	76
United States	109	Slovakia	70
Luxembourg	109	Poland	65
Australia	108	Italy	63
France	105	Greece	54

Sources: Akamai; Eurostat; Information Technology & Innovation Foundation; Organisation for Economic Co-Operation and Development; United Nations; MagnaGlobal; BCG analysis.

Note: The index is scaled so that the geometric mean equals 100.

Exhibit 5. The United Kingdom Performs Best on the Expenditure Sub-Index



Sources: Akamai; Eurostat; Information Technology & Innovation Foundation; Organisation for Economic Co-Operation and Development; United Nations; MagnaGlobal; BCG analysis.

Note: The sub-indices are scaled so that the geometric mean equals 100.

ers, and by government. The Nordic nations, Australia, and New Zealand led on engagement. The Nordic nations also scored well on consumer engagement, in particular, which measures the percentage of online users and their propensity to conduct various activities online. Switzerland led on business engagement, followed by New Zealand, Norway, and Australia.

The United Kingdom ranked eighth on government engagement, which measures the share of government interactions with businesses and the public which occur online and the number of schools with broadband; this measure also includes a series of United Nations measures of the provision of online services. Directgov, the U.K. e-government portal, has 10 million registered users and covers 75 percent of key government services. In 2009, about 60 percent of residents used at least one online government service, according to the Oxford Internet Institute, but only about 40 percent of U.K. businesses routinely interact with the government online. More effective deployment of e-government initiatives can reduce companies' administrative burden. The Netherlands, for example, has reduced administrative costs by 14 percent, equivalent to about 0.4 percent of GDP, through the use of online technologies.⁸

Elsewhere in the World

Outside the OECD, there are intriguing Internet developments afoot, especially in Brazil, Russia, India, China, and Indonesia (the BRICI nations).⁹ In many of these markets, consumers are leapfrogging the computer as a device to access the Internet and are using their mobile handsets instead. In China, for example, mobile penetration is 57 percent, nearly three times the 20 percent penetration of PCs. Actual usage is difficult to derive, however, because broadband services are often accessed at Internet cafés, and mobile phones are often shared.

The proportion of the population using the Internet in the BRICI nations is also low—between 7 and 33 percent, compared with 70 percent in the United States. But the level of innovation is high: microfinance and micropayments are bringing banking services to the unbanked. And services such as Nokia Life Tools are helping to meet people's agricultural, health, and educational needs.

Regional Differences

All nations do not exploit the Internet equally and neither do all parts of the United Kingdom. To understand the Internet's influence throughout the United Kingdom, we created a regional e-Intensity Index; it uses the same structure and methodology as the global index.

So long as companies have a broadband connection, they can enjoy the benefits of the Internet economy.

Not surprisingly, London emerged as the leading region, followed by the South East and the neighbouring East of England. The rest of England finished in the middle, and Wales, Scotland, and Northern Ireland scored fairly poorly. (See Exhibit 6.) The lower enablement scores of the less densely populated areas pulled down their overall rankings. (See Exhibit 7.)

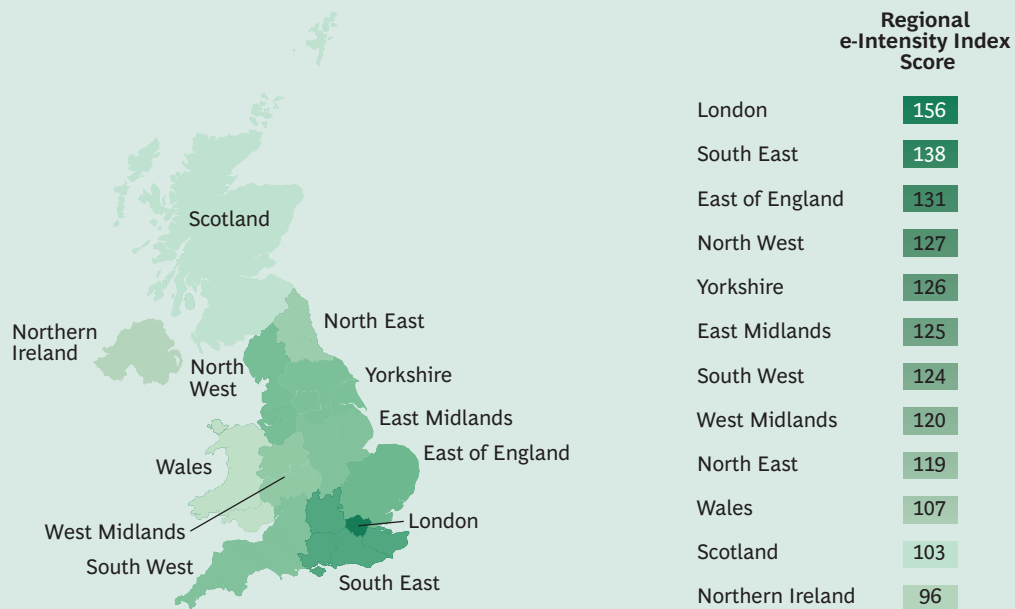
The engagement scores of the different regions provide a study in contrasts. While consumer and government engagement both correlate with many socioeconomic variables, such as average household expenditure, age, and education level, business engagement does not. The East of England and Scotland, for example, are on opposite ends of the socioeconomic spectrum, yet both have high business-engagement scores.

Of course, companies still have a large degree of freedom to chart their own destiny, even if the overall Internet climate within their region is lacking. So long as businesses have a broadband connection, they apparently can enjoy the benefits of the Internet economy, as the concentration of successful game companies in Dundee illustrates. Several small and medium enterprises (SMEs) profiled below are located in rural regions such as Herefordshire and Cheshire.

8. See Micus Management Consulting, *The Impact of Broadband on Growth and Productivity*, European Commission, 2008.

9. See *The Internet's New Billion: Digital Consumers in Brazil, Russia, India, China, and Indonesia*, BCG report, September 2010.

Exhibit 6. London Is the Centre of Internet Gravity



Sources: BCG survey of 914 small and medium enterprises; Ofcom; U.K. Office for National Statistics; BCG analysis.
Note: The index is scaled so that the United Kingdom's average matches its international e-Intensity Index score.

Exhibit 7. Rural Regions Have Low Enablement Scores



Sources: BCG survey of 914 small and medium enterprises; Ofcom; U.K. Office for National Statistics; BCG analysis.
Note: The sub-index is scaled so that the United Kingdom's average matches its international e-Intensity Index score.



The Great Transformation

At the end of the last century, a distinction which now seems quaint was made between the old economy of smokestacks and the new economy of Silicon Fen. Back then, the Internet was something apart from the everyday operations of most companies. Not any longer. The Internet is entwined in the nervous system of nearly all large companies and many SMEs, too.

The Internet's £100 billion contribution to the United Kingdom's GDP in 2009 was largely produced not by so-called Internet companies but by a wide range of businesses, large and small, across all industries. (For more on the companies powering the larger Internet economy, see the sidebar "Engines of the Internet.")

The Internet has altered almost every industry it has touched, with companies drawing on five fundamental transformational levers:

- ◇ Geographic expansion without the need for a brick-and-mortar presence in new markets
- ◇ Profitable sales of the "long tail" of products to small subsets of consumers
- ◇ Improved automation and information exchange across supply chains to increase efficiency and productivity
- ◇ Greater collaboration with and among customers, suppliers, and partners
- ◇ Increased transparency and a reduction in the ability of parties such as middlemen and brokers to take advantage of information asymmetries

Below we briefly explore how the Internet has transformed several established companies and disrupted industries from fashion to insurance.

Teaching Old Companies Internet Tricks

The Internet has been a mixed blessing for large, established companies. They have legacy assets and investments which cannot easily be switched off to make way for Internet technologies. Yet they also have the capital, resources, and scale to facilitate change.

In the airline industry, for example, many Internet-enabled innovations originated with low-cost carriers but eventually migrated to full-service carriers. Ryanair and easyJet introduced online booking more than a decade ago, when other airlines were still relying on agents and toll-free phone lines. Today about one-third of British Airways seats are booked through its website, dramatically lowering marketing and sales costs. The website also enables the carrier to offer more-responsive customer service, allowing travellers to select seats, check in, print boarding passes, and order additional travel or ancillary services.

The Internet has fundamentally altered retailing as well. Tesco, the fourth-largest global retailer, pioneered the so-called store fulfillment model of online grocery retail, creating the most successful U.K. online grocery operation, with annual sales in excess of £2 billion. By fulfilling orders through traditional stores rather than a centralised distribution operation, Tesco is able to save capital and give store managers an interest in seeing Tesco.com succeed rather than viewing it as a competitor. Argos, too, has become a strong Internet player, with more than

Engines of the Internet

The U.K. Internet economy is enabled by a group of companies which allow traditional companies to conduct business online. These companies are the engine of the Internet economy. They employ an estimated 250,000 people and have annual revenues of about £50 billion. (Since many of these companies sell to other businesses, this amount is not comparable to our GDP calculation, which only counts final sales to consumers.)

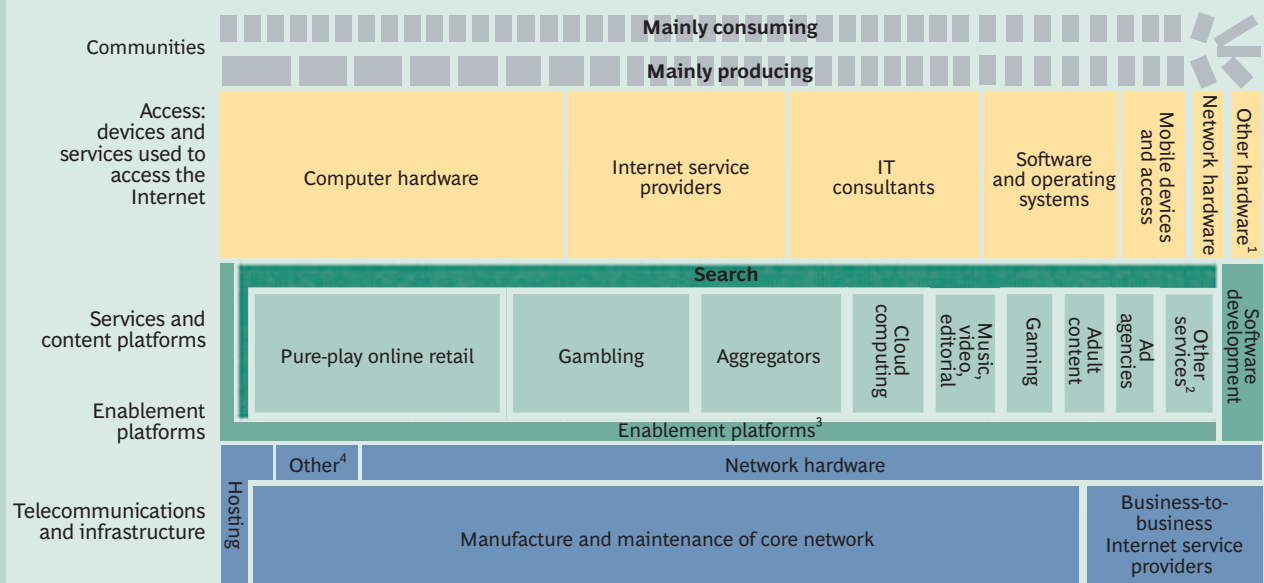
These companies are best described as a “stack.”¹ In IT, a stack is a set of layered software and hardware. Each layer can be swapped out and can communicate with layers above and below it. At the bottom of the stack is the physical infrastructure. Each higher layer contains a related horizontal set of activities. When Internet companies are viewed in this way, five layers emerge:

- ◇ *Telecommunications and infrastructure:* companies which build and manage the Internet’s infrastructure and optimise the delivery of content

- ◇ *Enablement platforms:* companies which provide essential services which facilitate trust, commerce, and traffic
- ◇ *Services and content platforms:* online retail sites, portals and aggregators, and other companies which serve the public or enable the provision of those services
- ◇ *Access:* companies which offer devices and services to access the Internet
- ◇ *Communities:* consumers who both consume content and services through the Internet and produce them through user-generated content, social networking, and other means

1. For each segment of the stack, several methods were used to estimate revenues and revenues per employee, including bottom-up market sizing, external estimates, and top-down macro estimates.

The Building Blocks of the Internet Stack



Sources: Advertising Association; Alexa; A.T. Kearney; Business Insights; comScore; Enders Analysis; Interactive Advertising Bureau; Gartner; Global Betting & Gaming Consultants; H2 Gambling Capital Consultants; IMRG; Informa; MagnaGlobal; *New Media Age*; Ovum/Datamonitor; PhoCusWright; press searches; BCG analysis.

Note: Size of the boxes is proportional to the estimated revenues of the companies within them.

¹Game consoles and other Internet-enabled devices.

²VoIP, online dating, e-learning, and social networking.

³Billing and payments, advertising networks and servers, analytics and metrics, verification, and encryption.

⁴Domain name registration and trading, mirroring, and content management.

Stacks are interoperable, modular, and open. These characteristics encourage the innovation and competition at the heart of the Internet's development.² Interoperability and openness lower barriers to entry and encourage participants in the stack to build upon the creative efforts of others. Modularity encourages competition among players within a layer. Were the Internet vertically integrated, it would be hard to imagine a comparable level of innovation or growth. In the exhibit on the previous page, the size of the blocks corresponds to the amount of revenue produced by the companies within them.

Many of the companies which make up the stack are relatively small cogs which are essential to the overall operation of the Internet. For example, Web hosting, domain name services, mirroring, and content management generate less than £1 billion in annual revenues in the United Kingdom. The group of companies which provide verification, encryption, billing and payments, analytics, and ad servers generate less than £1.5 billion in annual

revenue. But if they disappeared, e-commerce would grind to a halt.

Services and content platforms are a study in the invisible nature of the Internet economy. This layer, which includes Facebook and Wikipedia, comprises services such as VoIP, video sharing, online gaming, music, social-networking sites, and user-generated-content sites. The companies which provide these products and services generate about £13 billion annually, but the benefit to consumers is arguably much larger because so many of them are offered for free.

2. The Internet stack is the subject of a forthcoming book by Philip Evans, a BCG senior partner and coauthor of *Blown to Bits: How the New Economics of Information Transforms Strategy* (Boston: Harvard Business School Press, 2000).

30,000 products available online, 10,000 of which are available through this channel alone.

The Internet has obviously disrupted the media business, but several traditionally print-based companies are staking out a strong presence in the online world. The *Guardian's* guardian.co.uk has a larger share of the online market, as measured by unique daily visitors, than of the print market. The *Daily Mail's* MailOnline site has 2.6 million daily unique visitors, which is more than its print circulation.

The strong online following of these publishers should allow them to compete more effectively against portals, aggregators, and other pure-play Internet companies.

The BBC's website, meanwhile, ranks seventh in total traffic among all U.K. sites. The BBC's iPlayer Internet television and radio service generates about 5 percent of the country's Internet traffic at peak times and has about 8.5 million individual users each week.

All these companies have gone beyond merely being online to successfully transforming their business models to exploit the advantages of the Internet and generate growth.

Reshaping Industry

The Internet has reshaped not just companies but industries as well. Fashion and insurance, in particular, offer a window into the changing habits of Internet consumers and the power of the Internet to unlock value for consumers and companies alike.

Uncloaking the Fashion Industry. For many years, the fashion industry resisted the seductions of the Internet. It was and is an industry swayed by look and feel and—at least among shoppers—instant gratification. Designers, buyers, and shoppers want to touch the fabrics and see the colours and patterns of an article of clothing. Shoppers also want to make sure that it fits. Gradually, however, both consumers and fashion companies gave up their initial reluctance and have been drawn to the Internet. And the Internet has transformed both shopping and product development.

Online Shopping. Retailers which go online are able to expand geographically and develop close and collaborative relationships with customers. By shopping online, consumers are able to buy at low prices and access a wider selection of merchandise than is available in physical stores.

Today online sales account for about 14 percent of total sales of apparel—clothes, shoes, jewellery, and watches—in the United Kingdom. The online apparel market has grown by 15 percent annually since 2005. Online sales of apparel are projected to reach £5.4 billion in 2010, around 10 percent of total online sales and the equivalent of approximately £280 per online household.

Several pure-play online players have reshaped the online apparel market. Asos.com was founded in 2000 and today offers 36,000 designer and private-label products, free delivery, and free returns. Its online store is visited by nearly 7 million unique visitors per month, mostly shoppers aged 16 to 34. The company has taken advantage of social-networking tools, such as Facebook and Twitter, to communicate and collaborate with its young customers, and its website is complete with blogs, forums, and other user-generated content. Asos.com's revenues grew by 35 percent in fiscal 2010 (March), reaching £223 million, and its pretax profits increased by 44 percent to £20.3 million. More than one-quarter of the company's sales are from overseas.

Net-a-Porter, which was acquired by Richemont of Switzerland in June in a deal which valued the company at £350 million, has created a luxury shopping experience online—its site is similar to a fashion magazine—which 2.5 million users enjoy each month. Net-a-Porter offers same-day delivery in London and New York and easy returns for all customers.

Traditional retailers, such as John Lewis, House of Fraser, Burberry, and Marks & Spencer, have likewise discovered the benefits of offering online shopping. Rather than cannibalising their business, the online channel has increased overall sales for most companies. Marks & Spencer is investing heavily in its Internet business, with the goal of increasing its online market share in clothing—currently at 5.6 percent—to a level which is comparable to its presence in the brick-and-mortar market.

It's not just large companies and Internet start-ups based in thriving fashion centres such as London which are selling fashion online. UK Tights, founded in 2005 in Macclesfield in Cheshire, sells 23,000 types of hosiery from its 4,000-square-foot warehouse. The company, started by Dawn and Jonathan Barber, is the exclusive online retail-

er for several high-end manufacturers of tights and beachwear. Sales at the seven-employee company will exceed £1 million this year.

Accelerated Development. Fashion will always be more art than science, but the Internet is helping to both speed and systematise the development of new styles and products. In the past, it took more than a year to bring a new article of clothing to market, and it required frequent travel to spot trends, even more frequent guesswork, and long lead times to coordinate design, production, and marketing.

WGSN, based in London, is the leading trend-forecasting company in the world.

Its hundreds of fashion experts search the globe daily for the latest fashion trends. They collect, collate, and categorise millions of images from catwalks, stores, streets, and industry trade shows around the world. WGSN posts these images and related commentary on its members-only website, affording designers, buyers, and executives enhanced insight into the global fashion zeitgeist. The website also has forecasts, news updates, and vast archives of historical images to help the fashion industry capitalise on trends. The instantaneous distribution of this intelligence would be impossible without the Internet. Likewise, www.businessoffashion.com, a London-based blog, and similar sites have rapidly gained an influence over designers, retailers, and other industry players.

Cutting Out the Middleman in Insurance. Automobile and homeowners insurance was a market just waiting for the Internet. In the past, insurance was traditionally sold by brokers or agents paid by commission. A consumer would have to make several calls or visits to compare quotes and coverage and still not be sure he or she was getting the best deal.

But brokers and agents were generally not performing a complex task. The pricing for both types of insurance is based on rules and standardised formulas for calculating risk. For autos, the driver's age, the type of car, and the miles driven are common factors, while for homes, the size of the dwelling and its distance from a fire hydrant go into the calculation. Finally, information for gauging the ability of insurers to pay claims is readily available through ratings agencies.

It's not just large companies and Internet start-ups which are selling fashion online.

Adapt . . . or Else

Change is hard, especially for large organisations and industries. The Internet is forcing a range of companies to make fundamental changes to their business models and operations. The economics of telecom and content companies—newspapers and record labels, in particular—have been disrupted by the Internet.

For telcos, VoIP has allowed competitors like Skype to offer free alternatives to once profitable services. For newspapers, free Internet listings have wounded the cash cow of classified advertisements. For record labels, the Internet has allowed consumers to access pirated copyrighted works.

These fundamental shifts in industry economics are painful, but they are not the sole cause of the difficulties these industries are facing. To take just a single industry, for example, television and lifestyle changes were altering the newspaper industry's economics long before the rise of the commercial Internet. Publishers put their content on-

line for free in the expectation that they would generate advertising revenue. The *Times* and the *News of the World* have now reversed course and are starting to charge for online content, but it's not easy to get people to pay for what was once free.

We have seen this dance before. The emergence of game-changing technologies creates winners and losers and forces established players to adapt. "Creative destruction" is part of the DNA of capitalism.

The demand for telecommunications, news, and recorded music has not disappeared, but how those goods and services are delivered has been radically altered by the Internet. For example, recent research by BCG suggests that consumers are willing to spend for content on tablets and e-readers. The success of content industries hinges on their ability to create new business models which take advantage of the scale, cost position, and ubiquity which the Internet offers.

The Internet changed the game by replacing these intermediaries with transparency. In the United Kingdom in the early 2000s, several companies—called aggregators—such as *Moneysupermarket.com* and *Confused.com* created websites which allowed customers to quickly compare auto quotes and coverage from several insurers. By 2007, more than half of new auto policies originated online, with the share fairly evenly divided between traditional insurers and aggregators. Today nearly three-quarters of the U.K. market for new policies, or 74 percent, has moved to the Web, with aggregators controlling more than three-quarters of those sales.

Household insurance was slower to move online. Only one-quarter of new policies written in 2007 came through the online channel. But the pace has quickened, with nearly half of the market for new policies, or 48 percent, now originating on the Internet. Aggregators control about 60 percent of the online market, up from about 50 percent in 2007.

The online channel has been a tremendous benefit for consumers because of lower premiums. From 2003 to

2008, the total volume of U.K. auto and household premiums declined by 4 percent annually and for the past two years has stayed flat. Prior to 2003, premiums had been rising by 10 percent per year.

This flourishing online economic activity has not been painless. The Internet has forced almost all companies to fundamentally alter how they do business. And while the Internet has facilitated the creation of new businesses and business models, it has disrupted others. (See the sidebar "Adapt . . . or Else.")



The Big Embrace by Small and Medium Enterprises

SMEs have historically been the hidden engine of many national economies, but they have not necessarily operated on the “bleeding edge” of technology. The Internet is starting to change that dynamic. In the United Kingdom, many SMEs are aggressively exploiting the Internet to take advantage of the same sets of transformative levers—geographic expansion, collaboration with customers, and the like—available to larger companies. In addition, the Internet is helping to level the playing field, giving SMEs access to larger markets through cost-effective online advertising and tools once available only to large companies.

The home design site mydeco, for example, rents time on the “cloud”—which makes computing resources available over the Internet—in order to do short bursts of processing which keep its index of products up to date. Mendeley, also based in London, has created a business around research collaboration—iTunes plus LinkedIn for academics. The company has more than 500,000 users and performs real-time analytics on more than 40 million crowdsourced documents, a scale which cofounder Victor Henning says would not be possible without the cloud.

While these two companies may be typical Internet startups, most SMEs using the Internet sell more ordinary items, such as flowers and worms—yes, worms. Wiggly Wiggles sells as much as half a tonne of worms a week online. (See the sidebar “World Wide Worms.”) As to flowers, when Arena Flowers opened in 2006, it did not want to be just another corner shop. Instead, it set out to build scale, efficiency, and customer loyalty with an online store which now boasts 150,000 unique visitors per month and will generate close to £5 million in sales this year. (See the sidebar “A Flowering Online Presence.”)

SMEs account for half of the annual revenues of U.K. companies. They also provide jobs to half of the country’s private-sector employees. Three-quarters of these companies are located outside London and the South East. They include an amazingly wide array of businesses, from the local corner shop to global businesses.

In order to understand their Internet activities, BCG conducted a survey of more than 900 SMEs, which the ONS defines as companies with fewer than 250 employees.¹⁰ We also conducted in-depth interviews with executives at nine of these SMEs and analysed data from the ONS. We divided the survey respondents into three groups: “high-Web” businesses (66 percent of survey respondents) market or sell goods or services online; “low-Web” businesses (20 percent of respondents) have a website or social-networking site; and “no-Web” businesses (14 percent of respondents) do not have a website.

The key overall finding: the Internet is paying dividends for SMEs which take advantage of it. Data from the ONS show that online sales grew by 43 percent annually from 2004 to 2008 for these businesses, faster than for companies with 250 to 999 employees (39 percent) or for those with 1,000 or more employees (31 percent). Our survey shows that overall sales of high-Web businesses grew by 4.1 percent annually over the past three years, while those of low- and no-Web businesses grew by 0.6 percent and 0.5 percent, respectively. High-Web and low-Web businesses, meanwhile, have a much larger international presence than no-Web businesses. The high-Web respon-

10. The survey was conducted with key decision makers at 914 SMEs. Forty percent of the enterprises had fewer than ten employees, 40 percent had 10 to 49 employees, and 20 percent had 50 or more employees. The respondents were distributed equally among regions.

World Wide Worms

Wiggly Wigglers is located in Blakemere, a village of 65 people (and twice as many cows) in Herefordshire. Heather Gorringe created the company in 1990 to sell composting worms but it has since expanded to sell a full range of garden supplies with a green bent. She created a passive website in 1995, but the business did not really start taking off until 2001, when Heather and her husband, Phil, started selling online.

They quickly discovered that online advertising was much more effective—and measurably so—than the display advertisements they had once bought in national magazines and newspapers. Their company has since become an active and successful user of Google AdWords, podcasts, Twitter, YouTube, and Facebook.



In 2008, Wiggly Wigglers won the global Dell Small Business Excellence Award for its use of the Internet in customer service. The Internet has essentially turned a small family-farm operation into an enterprise with projected sales of £2.5 million this year. “Without the Internet, there would not be a business and certainly it would not be shaped like it is,” Heather Gorringe says.

Wiggly Wigglers does not just sell and market itself online. It also runs its operations on the Internet. For instance, when it needed a new computer system to manage accounts, inventories, and customer service earlier in the year, it turned to a provider of cloud-based accounting and customer-relationship-management services.

A Flowering Online Presence

Arena Flowers has built a business around getting flowers to customers as quickly as possible. Flowers are generally delivered within two days of being picked and, in London, within hours of being ordered.

Many U.K. florists offer an online store, but Arena Flower’s online store is just its public face. Behind the scenes, the Internet integrates the company’s entire supply chain, from the moment the flowers are bought at auction in Holland to their delivery to the recipient and the customer’s receipt of a text message.

Unlike many other phone-order or online florists, which send the orders they receive to local florists, Arena Flowers buys direct at auctions and from growers. By buying wholesale and delivering direct, Arena is able to take advantage of scale, control quality, and deliver better value to the customer.

Outside the United Kingdom, Arena Flowers has local-language websites in France, Germany, Holland, and Bel-



gium. The company is able to reach about 220 million people with next-day delivery. About 20 percent of its revenues come from overseas.

Arena Flower’s website has built-in intelligence that encourages cross-sales. A customer sending flowers to new parents, for example, might be offered the option of sending a “new baby” teddy bear. “There was an opportunity to use the power of the Internet to provide a richer experience for customers,” says co-founder Will Wynne.

The company is always looking for novel ways to reach customers and potential customers. On Facebook, users can send virtual Arena Flowers to friends. The company has an automated programme which monitors Twitter traffic and sends birthday wishes to people whose incoming tweets suggest they are celebrating a birthday. It sent about 80,000 birthday tweets in the first few months of operation. A smartphone application is under development.

dents to our survey reported that international sales make up nearly 14 percent of their revenue, while no-Web businesses record about half that level. Many SMEs report that they would not exist without the Internet. (See the sidebar “Tartan Triumph.”)

London, nearby East of England, and Scotland have the largest share of high-Web businesses, while Northern Ireland, the North East, and Wales have the lowest. (See Exhibit 8.) There is similar variation among industry sectors, with marketing and advertising and leisure and recreation having the highest percentage of high-Web businesses. Real estate and the trades (plumbers, electricians, and the like) have the lowest share.

A few companies in low-Web sectors have nonetheless been able to build their business by relying on the Internet. Always Locksmith of London, for example, has built nearly a £1 million business in three years largely through pay-per-click advertising. Using trial and error, the company figured out how to adjust its advertising spending in order to grow the business at a pace which ensures high quality. Always Locksmith also assesses customer demand for new products and services with tests conducted through AdWords, Google’s keyword-based advertising service.

Survey respondents identified six primary benefits of the Internet to their businesses: geographic expansion, access to online tools, easier recruitment of staff, simplified customer payments, increased feedback and interaction with customers, and more effective marketing.

U.K. gaming companies, in particular, have taken advantage of the Internet—especially social-networking sites—to gain market traction. For example, Playfish’s Facebook game Pet Society has attracted millions of daily users. The company was acquired in November 2009 for £240 million by Electronic Arts. In 2008, London-based Mind Candy launched Moshi Monsters—an online game which allows children to adopt and look after a monster. The game has attracted nearly 30 million players in 150 countries. In the United Kingdom, one in three children aged 6 to 12 has an account. The game is free, but premium memberships are available for £5 a month. Mind Candy founder Michael Acton Smith says that the Internet allows gaming companies to achieve global reach without any physical presence or relationship with retailers.

Other high-Web SMEs use the Internet for a variety of sales and marketing and social-networking activities. More than 60 percent of high-Web businesses use search-engine optimisation or online advertising. (See Exhibit 9.)

Not all SMEs are so sophisticated about how they manage their business on the Internet. The primary reason that low- and no-Web businesses are not exploiting the Internet more aggressively is insufficient broadband connections, according to the survey. However, these respondents also said they were sceptical that the Internet would benefit their business. But the half-tonne of worms which Wiggly Wiggles sells each week and the 20,000 deliveries which Arena Flowers completed on Mother’s Day suggest otherwise.

Tartan Triumph

Scotweb was founded in 1995 in Edinburgh to sell and market kilts, bagpipes, tartans, and other Scottish speciality goods online. Today it is a £1.5 million business with nearly all sales conducted over the Internet and 80 percent of sales from overseas, especially the United States.

The Internet has brought together a traditional industry with faraway consumers in a way which would not have been possible through traditional means. In fact, according to Nicholas Fiddes, the company’s founder, the Internet has helped keep many of the traditional craftsmen of tartan in business.

The Internet allows Scotweb to sell 17,500 types of tartan, far more than a brick-and-mortar shop could stock. Customers can even modify the weave, patterns, and colours of tartan with an online tool. Scotweb spends 95 percent of its marketing budget on the Internet. It has an active presence on Facebook, Twitter, and YouTube, showing potential customers how Harris Tweed is woven and how a kilt should be worn. The Internet has also facilitated a level of efficiency not previously possible. The nine-employee company has improved productivity—and reduced the size of its workforce—by taking advantage of online tools and Internet-enabled processes.

Faces of the Internet



UK Tights

This family-owned and family-run hosiery business, based Macclesfield in Cheshire, attracts about 65,000 average monthly unique visitors and sells about 23,000 varieties of tights in the United Kingdom and beyond.

Pictured: Dawn Barber, cofounder

Year founded: 2005

Number of employees: 7



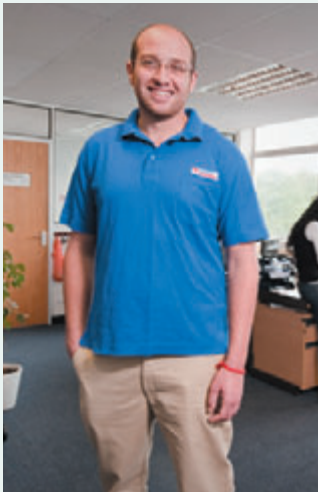
mydeco

Mydeco allows consumers to design rooms using sophisticated 3-D online tools. In three years, it has built a strong brand which attracts 1.2 million unique visitors per month.

Pictured: Nicole Vanderbilt, CEO

Year founded: 2007

Number of employees: 30



Always Locksmith

Always Locksmith devotes 80 percent of its marketing budget to the online channel. It assesses demand for new products and services with tests conducted through Google's AdWords service.

Pictured: Assaf Touboul, cofounder and sales manager

Year founded: 2008

Number of employees: 6 in the back office and 10 locksmiths



Mimecast

Mimecast provides e-mail security, storage, and availability services to 3,000 business customers. It was recently ranked the second-fastest-growing U.K. technology company by the *Sunday Times*.

Pictured: Peter Bauer, CEO

Year founded: 2003

Number of employees: 225



Mendeley

Mendeley has built one of the world's largest research databases in less than 20 months. The cloud allows the company to perform real-time analytics, such as text mining, statistics generation, and document searches.

Pictured: Victor Henning, cofounder and CEO

Year founded: 2007

Number of employees: 35



Mind Candy

Moshi Monsters, the brainchild of Mind Candy, is one of the world's fastest-growing online games for children. About 30 million users adopt and take care of their own virtual monster and play puzzle games.

Pictured: Michael Acton Smith, founder and CEO

Year founded: 2008

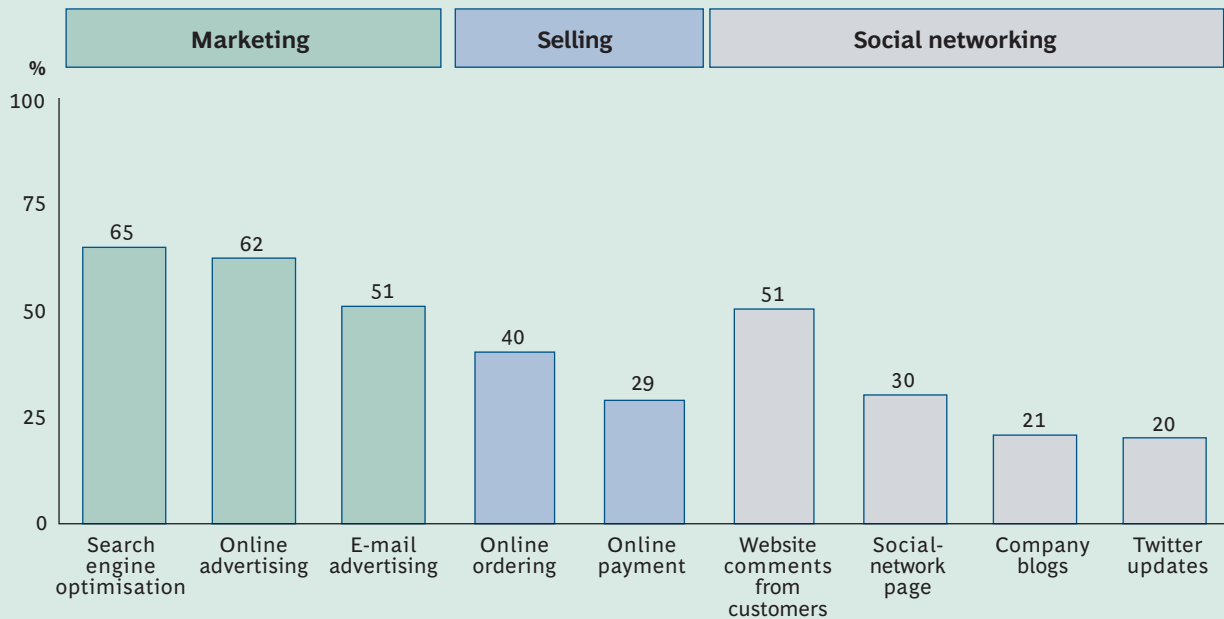
Number of employees: 35

Exhibit 8. SMEs in Three Regions Have the Highest Levels of Internet Use



Sources: BCG survey of 914 small and medium enterprises; BCG analysis.
 Note: Some totals do not add up to 100 because of rounding.

Exhibit 9. High-Web Businesses Use the Internet Mainly for Search Engine Optimisation and Advertising



Sources: BCG survey of 914 small and medium enterprises (519 of which are high-Web businesses); BCG analysis.
 Note: Percentages represent the share of businesses which actively use the Internet which engage in each category.



Big and Getting Bigger

The commercial Internet is still a work in progress. Many consumers are only now starting to buy and sell goods and services online. The shopping experience is likely to dramatically improve for all consumers as three-dimensional renderings of products and mobile e-commerce platforms mature.

To get an idea of the future size of the Internet economy, we made several projections. The most important were broadband adoption and consumer adoption of online shopping, both of which drive consumption. In looking forward, we tried to be conservative. But several underlying trends—and the response to them by governments, businesses, and consumers—will have a strong and unpredictable influence on growth and value.

Given these and other uncertainties, we estimate that the U.K. Internet economy will grow by about 10 percent per year.¹¹ (See Exhibit 10.) This is significantly faster than most sectors in the economy. If GDP grows annually by 4 percent, the Internet economy will make up about 10 percent of GDP by 2015—and could conceivably reach 13 percent. (See the sidebar “Assumptions of Future Growth.”) Consumption is likely to be the largest contributor to growth, with the other components of GDP growing approximately in line with overall GDP.

As markets in the West continue to suffer from the after-effects of the Great Recession, growth is at the top of nearly all national economic agendas. Our projections, and the business and industry transformations discussed earlier, suggest that the Internet can play a key role in enabling growth. Recent research demonstrates that investments in ICT have contributed to economic growth across the European Union.¹² Higher productivity in the United

States, meanwhile, has been traced to greater use of technology and a more competitive business environment. Removing the barriers that impede the use of technology in the United Kingdom is key to maximizing the Internet’s impact on productivity and growth.

The Upside and the Downside

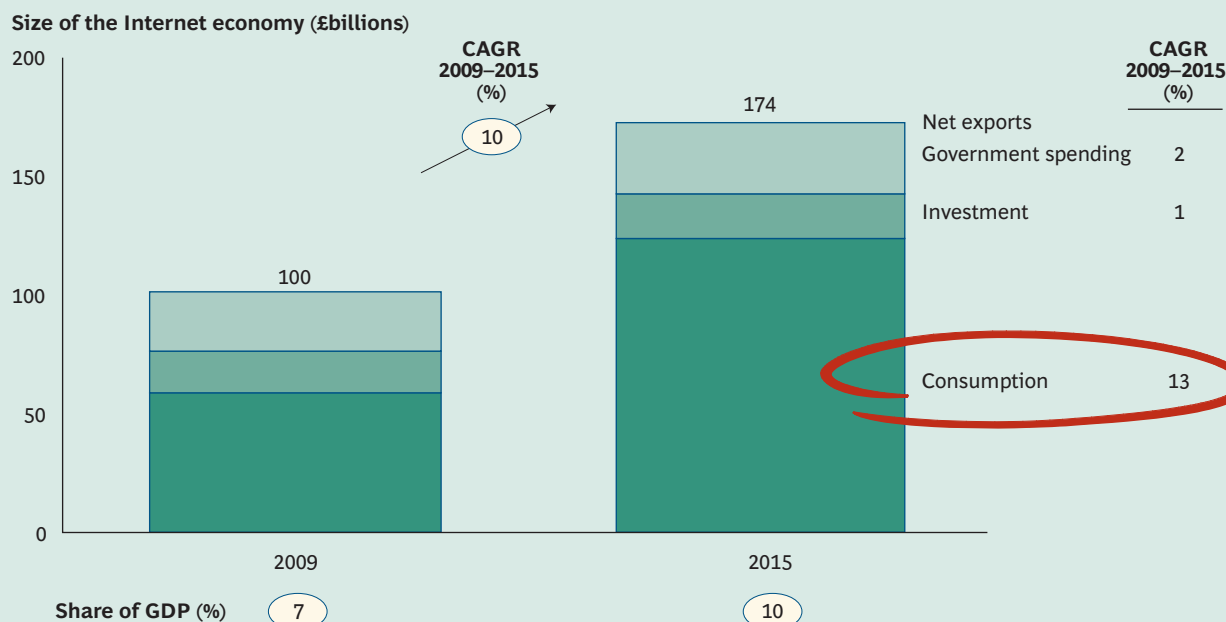
What would it take for the Internet to represent as much as 13 percent of GDP in the United Kingdom by 2015—or to fall short of this potential growth? There are several determining factors.

- ◇ *The Quality of the Broadband Infrastructure.* Advanced Internet services, such as high-quality video and mobile data, need to run on a rock-solid infrastructure. The popularity of the iPhone, for example, has already taxed the capacity of carriers in many markets. The ability of carriers to create additional capacity—and to set adequate prices—is critical to long-term growth in the Internet economy.
- ◇ *Crossing the Digital Divide.* One in five U.K. adults do not use the Internet and are missing out on its benefits. The government has set a goal of universal access by 2015. If this goal is met, the U.K. Internet economy would benefit tremendously.
- ◇ *Capturing the Multichannel Opportunity.* The distinction between online and offline transactions is already blurring and will further weaken. Consumers will in-

11. Growth rates are based on current price levels.

12. U.K. Office for National Statistics, *ICT Impact Assessment by Linking Data Across Sources and Countries*, 2009.

Exhibit 10. Consumption Will Drive Future Internet Growth



Sources: AllianceBernstein; Economist Intelligence Unit; European Commission; IMRG; Gartner; International Telecommunication Union; U.K. Office for National Statistics; Ovum/Datamonitor; BCG analysis.

creasingly be online all the time as the penetration of smartphones, e-readers, and tablets rises. As this happens, these consumers will probably increase their online spending.

- ◇ *Embedded Internet Functionality.* The Internet is likely to become even more pervasive as machine-to-machine connectivity allows consumers to buy goods from vending machines and pay taxi fares with their smartphones. Machine-to-machine connectivity will eventually be embedded in home appliances, television, game consoles, and other electronic devices. These developments are now most advanced in Japan, but they are likely to spread to other markets.
- ◇ *New Business Models Which Monetise Consumer Surplus.* The economic value of much of the “free” content available on the Internet today is still too small to monetise. As micropayment systems are developed, these transactions will be captured in GDP.
- ◇ *Consumer Confidence.* The vitality of e-commerce depends on confidence in the security and privacy of

payment systems. A failure of these systems could fundamentally alter consumers’ willingness to spend online.

- ◇ *Openness.* Openness has been a cardinal strength of the Internet, driving innovation and inclusiveness, but it is now under stress. Companies have tried to create walled gardens and proprietary platforms to protect or increase profits. Carriers have proposed creating a “fast lane” on the Internet for premium traffic. Some countries have censored access to some forms of content. It is too early to tell how these developments will play out, but they could affect the level of innovation and participation in the Internet economy.

Shaping the Future

The United Kingdom is well positioned globally, as the BCG e-Intensity Index demonstrates. But that position is not guaranteed. It will depend on the actions of businesses, central and local governments, and individuals.

Assumptions of Future Growth

Our estimate that the U.K. Internet economy will grow at 10 percent annually is based on the following assumptions.

Consumption. Consumption in the Internet economy is likely to grow by at least 13 percent annually until 2015. This growth rate is predicated on two further assumptions. First, broadband penetration will rise to 84 percent from 70 percent, as the Economist Intelligence Unit is predicting. Second, goods and travel purchased online will account for 30 percent of online consumers' overall purchases, compared with 23 percent today.

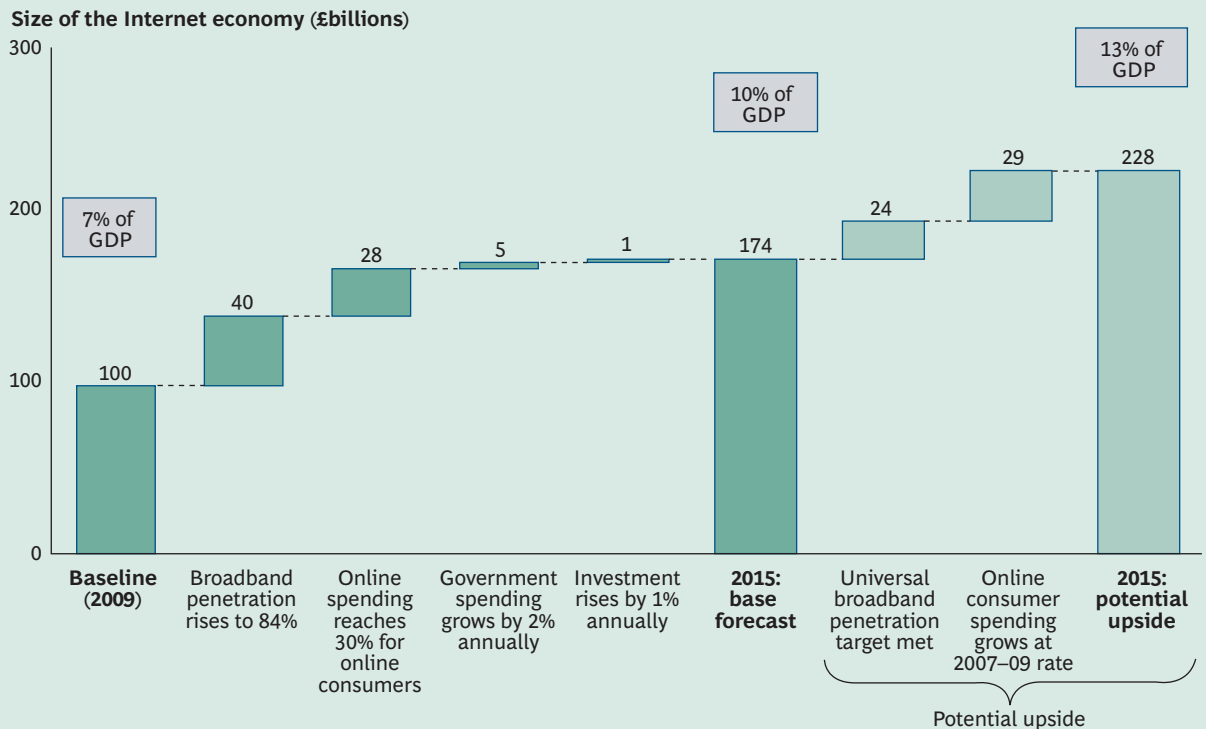
Assumptions can be slippery things, but these are meant to be reasonable. The penetration rate is relatively modest compared with the government's target of 100 percent adoption by 2015. If consumer acceptance of online shopping follows its 2007 to 2009 trajectory, it will hit 36 per-

cent in 2015. However, we are anticipating a slower rate of growth, on the assumption that late adopters will be reluctant and lower-spending online shoppers.

If these assumptions turn out to be too conservative, the Internet economy could conceivably exceed 13 percent of GDP by 2015. (See the exhibit below.) That projection assumes that the United Kingdom does achieve the government's target of universal broadband adoption and that consumer adoption of online shopping continues its current growth rate. Online shopping could possibly accelerate as people spend more time online and "digital natives," who grew up with the Internet, enter the workforce. (See the Appendix for more detail on future growth in consumption.)

Investment. We forecast that business investment in the Internet will grow by only about 1 percent annually. The

Assumptions About Broadband Penetration and Consumer Behaviour Can Make a Big Difference



Sources: AllianceBernstein; Economist Intelligence Unit; European Commission; IMRG; Gartner; International Telecommunication Union; U.K. Office for National Statistics; Ovum/Datamonitor; BCG analysis.

Note: Some amounts may not add up to the numbers shown because of rounding.

Assumptions of Future Growth (continued)

biggest contributor to future growth will be business investments in software, as companies integrate the Internet into their existing business processes. We anticipate software investments rising by 6 percent annually, while telco and business investments in hardware remain flat.

Government Spending. We project government spending to grow by 2 percent annually. This includes government spending on hardware, software, IT services, and telecommunications at both the local- and central-government levels. While U.K. government entities could tighten IT spending, we believe this is unlikely given the potential

cost savings from e-government initiatives, the national government's digital-inclusion efforts, and the importance of the Internet economy to the United Kingdom.

Net Exports. If the ratio of exports to online shopping remains constant, net exports of e-commerce goods and services will grow much faster than net imports of ICT equipment. By around 2012, exports will exceed imports, and by 2015, the United Kingdom will be a net exporter of £3.5 billion in Internet goods and services.

Companies large and small need to transform their businesses by embedding the Internet in all aspects of their operations. This requires investment in technology and skills—and a willingness to adopt new business models. Entrepreneurs must seize the opportunities to start new businesses and grow them so that they can serve new markets and consumer segments.

Government needs to encourage consumer adoption, ensure access to infrastructure which is ubiquitous, fast, reliable, and secure, and remove barriers which prevent

companies from transforming their businesses. It can also be a forerunner in the adoption of innovative Internet ideas.

Innovation is at the heart of the U.K. Internet economy, and it must keep beating strongly.



Appendix

Methodology

The assumptions and analyses that form the basis for this report are outlined below.

GDP

The *expenditure method* of calculating GDP measures total spending on finished goods and services. Assumptions outlined in the main report are not reprised here.

Consumption. Online spending includes spending on most goods and services. Spending on access includes consumer fixed and mobile Internet-service-provider charges: a proportion of spending on interface devices, such as computers or mobile phones, and infrastructure devices, such as wireless routers.

Estimates are calculated using research reports and data from Euromonitor, Gartner, International Data Corporation, the U.K. Office of Communications (Ofcom), the U.K. Office for National Statistics (ONS), Interactive Media in Retail Group (IMRG), IAB Europe/Google Consumer Commerce Barometer survey, and Ovum/Datamonitor.

Investment. We included the total value of fixed and mobile telecom investments, on the theory that they are all needed to maintain and facilitate broadband services. We included a portion of private investments in hardware and software spending by looking at the proportion of corporate-owned computers which have a broadband connection and employees using a broadband connection. Finally, we included all private investments in telecom equipment. Estimates are based on research by Gartner, ONS, the European Commission, and Sanford C. Bernstein.

We did not include an estimate for internally developed software, even though it probably represents a significant element of Internet-related capital expenditure, because too many assumptions would have been necessary.

Government Spending. We estimated public spending on information and communications technology (ICT), including hardware, software, telecommunications, and support services, based on research by Gartner and internal estimates.

Net Exports. We estimated net exports of e-commerce and ICT equipment based on data from Eurostat, YouGov, and the OECD.

GDP Growth

We estimated growth in consumption by projecting online consumer spending and spending on access. The consumer spending estimate is based on projections of the percentage of spending conducted online, retail spending per household, and the number of households using the Internet. The access spending estimate is based on projections of the number of broadband subscriptions and the cost per subscription.

Estimates of growth in investment are based on forecasts by the sources used to build the baseline estimate.

e-Intensity

The overall international and regional indices are formed as a weighted mean of three sub-indices: enablement, engagement, and expenditure. The engagement sub-index

is formed as an equally weighted mean of three further sub-indices: businesses, consumers, and government. All of the sub-indices are then formed as weighted means of several underlying metrics. (See the exhibit.)

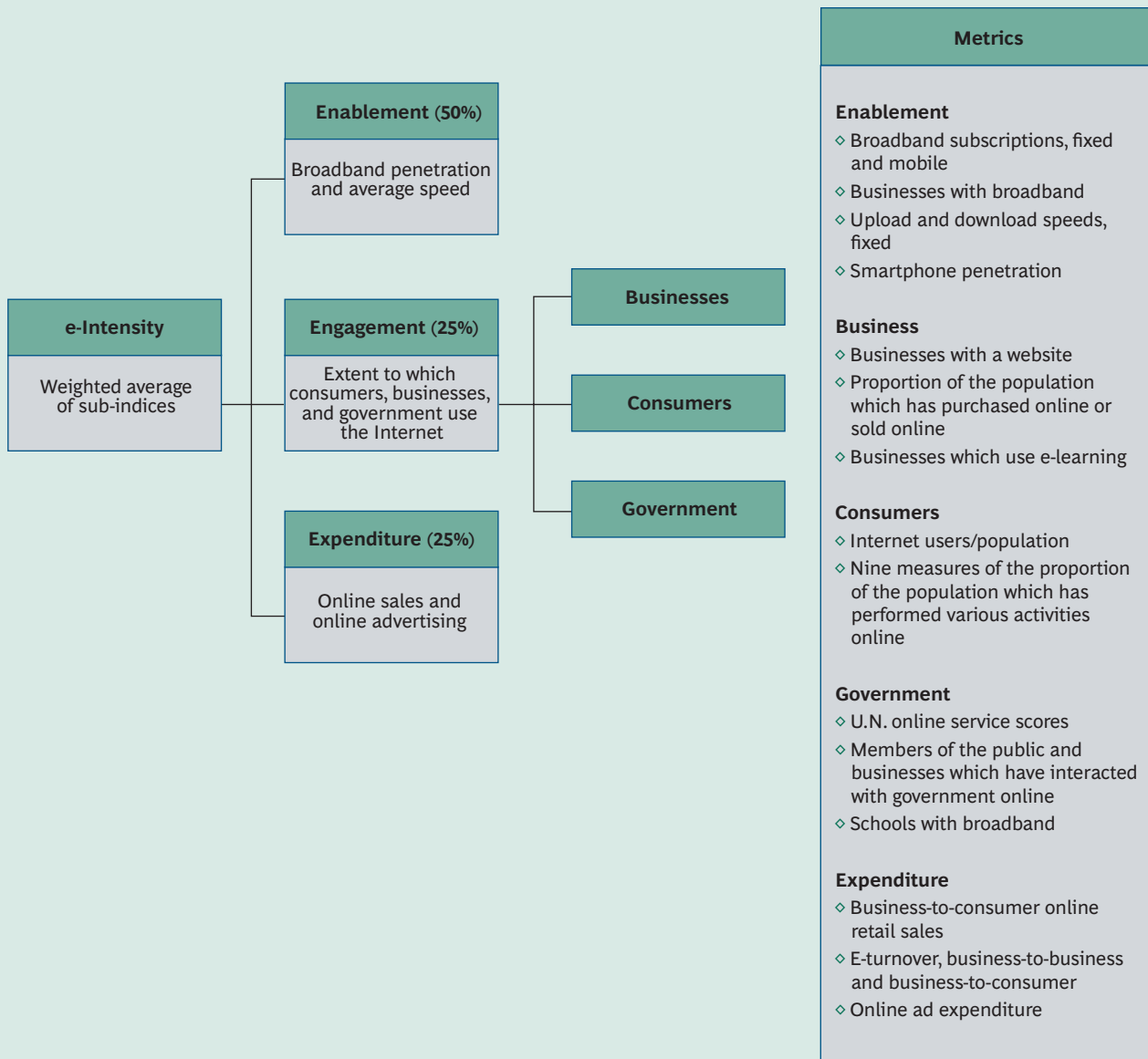
Data are not available for every single metric and country for the international index. We input the missing data through regression, using metrics which are strongly correlated. We transformed the data so that the indices and sub-indices would measure proportional differences in the data.

To ensure intuitive interpretation, we transformed the indices and sub-indices and scaled them so that a reference value—the geometric mean of each index for all countries—was set to 100. As a result, if country A is awarded 110, then the metrics for country A are, on average, 10 percent higher than the average value.

We also tested how sensitive the country rankings were to changes in the weights and choice of metrics by carrying out a Monte Carlo simulation using random weights and variables. The inter-quartile ranges were very small when a metric was randomly omitted.

The index is somewhat sensitive to different weightings. In each iteration of the Monte Carlo simulation, the weight of each of the metrics and sub-indices was randomly modified. The inter-quartile range for each country was small, but there were groups of countries with similar mean scores and overlapping inter-quartile ranges. For example, the analysis shows that the rankings for the Netherlands, the United Kingdom, Norway, and Finland cannot be easily distinguished.

The Structure of the e-Intensity Index



Source: BCG analysis.

Note: Percentages in parentheses indicate the weight given to each sub-index.



Note to the Reader

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