AT Kearney

The Internet Economy in the United Kingdom

The Internet has transformed life in the United Kingdom, allowing access to any information, anywhere, anytime. But how much "value" does the Internet—fixed, mobile, e-commerce—contribute to the U.K. economy?

Internet economy: strengths and weaknesses

When Vodafone connected the first ever mobile phone call in the United Kingdom back in 1985, it began a global revolution that has transformed the way we live and work. It is a revolution that the United Kingdom continues to lead, and that has helped Vodafone become a true multinational player. Vodafone is the world's seventh most valuable brand and the only mobile operator still headquartered in the United Kingdom.

The mass adoption of mobile Internet, driven by the rise of smartphones, is propelling the current phase of this communications revolution. As this report demonstrates, mobile Internet usage is growing more than 80 percent per year and becoming the bedrock of a burgeoning e-economy. It is driving dramatic changes in productivity by enabling smarter ways of working.

But we must not be complacent. If we are to continue to drive growth and create more jobs in the United Kingdom, then we need to understand the strengths and weaknesses of our Internet economy. This is why Vodafone commissioned this important research.

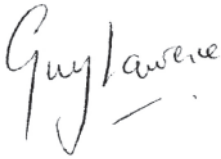
The U.K. Internet economy is currently worth £82 billion, or 5.7 percent of GDP. It is growing strongly year-over-year and as a result of rapidly increasing smartphone penetration, mobile is one of its fastest-growing elements. This report underscores the crucial role that connectivity plays in the Internet economy. For every £1 spent on Internet connectivity, £5 in value is created.

Spending on fixed and mobile networks has serious public policy implications as the government considers investing in the country's infrastructure to promote economic growth.

Many companies in the U.K. Internet economy rely on the investment in networks made by other organisations to carry out their business. The government needs to be mindful of the demands made by so-called "over-the-top players" and balance them with the need for long-term investment in crucial infrastructure. This is especially important when allocating scarce national resources such as wireless spectrum.

In a globalised market, many of the companies that deliver services in the United Kingdom are also based outside our borders and beyond the responsibilities of national and even European regulators. The challenge for the government and our regulators is to ensure that British-based companies can compete on a level playing field with those companies that are based abroad but provide services in the United Kingdom.

Ultimately the United Kingdom will get the network and infrastructure it deserves. It was the supportive regulatory environment created by the government a generation ago that helped encourage the investment that resulted in that first pioneering mobile call. We need the same vision today to support the development of the U.K. Internet economy and the networks upon which it depends to ensure that British companies can compete on equal terms with their international rivals.



Guy Laurence
CEO, Vodafone UK

vodafone

Executive Summary

Total U.K. Internet traffic is expected to increase by an average of 37 percent every year between 2010 and 2015. Although the majority of traffic remains on fixed networks, traffic on mobile networks is growing 84 percent year over year and is expected to account for 11 percent of total traffic by 2015. In fact, mobile access to the Internet accounts for a higher share of time spent browsing, communicating, and transacting than the traffic data suggests. While fixed networks are more often used for bandwidth-intensive services such as video or catch-up TV, mobile is used more often for social media. Indeed, more users are accessing the Internet on mobile devices, whether through mobile or Wi-Fi networks, and the next generation of mobile communications (4G or LTE) will shift this dynamic further. On top of that, the rapid adoption of smartphones and tablet devices—penetration has doubled in the past two years—will also sharply increase this growth over the coming years. Vodafone alone reports that 90 percent of its new contracts in the United Kingdom are now sold with a smartphone.

Yet there is little evidence to demonstrate the Internet's value to the U.K. economy specifically, or the mobile industry's contribution to that value. In 2008, A.T. Kearney conducted a study of the global Internet value chain, finding £1.190 trillion in revenues.[1] This study, The U.K. Internet Value Chain, 2012, focuses specifically on calculating the value of the U.K. Internet value chain—including the component services, related infrastructure, and e-commerce conducted—and mobile connections within this market. This report was commissioned by Vodafone but produced independently. Key findings from the study include:

- The U.K. Internet ecosystem is worth £82 billion a year, with mobile connections accounting for 16 percent of this; mobile's contribution is increasing rapidly as smartphone penetration rises.[2]
- Every £1 spent on Internet connectivity—mobile and fixed broadband networks—currently supports £5 in wider revenue for the U.K. ecosystem.
- Of the total £82 billion U.K. Internet economy, £37 billion is in the Internet value chain and £45 billion in the e-commerce it supports. The value chain is 2.6 percent of the country's GDP, while e-commerce is a further 3.1 percent.
- The United Kingdom has a much stronger business-to-consumer e-commerce sector than other countries, with the proportion of business-to-business e-commerce to GDP triple the global average.
- Of the £37 billion that makes up the U.K. Internet value chain, connectivity services, including mobile, represent the largest market with 35 percent, or £13 billion.
- Forecasts of U.K. connectivity revenues suggest that mobile revenues will remain flat even as traffic increases five-fold.
- Connectivity represents 72 percent of the total capital investment in the global Internet value chain. There is no reason to believe it is any different in the U.K. Internet value chain. In fact, it could be higher due to the smaller proportion of capital spending on the development or manufacture of end-user devices and software. It is this investment that underpins the future of the entire value chain.

[1] All monetary amounts in this paper are in sterling pounds unless otherwise noted. The Internet value chain's size was calculated at $1.930 trillion in 2008 and converted to pounds using 2008 exchange rates.

[2] The Internet ecosystem comprises companies that provide Internet-related services, such as connectivity and search, and e-enabled companies that use the Internet as sales and distribution channels.

Connectivity is the most capital-intensive part of the Internet economy. Ensuring that the U.K's fixed and mobile networks are equipped to handle the significant growth in traffic requires a strong domestic base of Internet companies and high-quality infrastructure. Both are crucial to boosting the Internet value chain's overall contribution to the U.K. economy, and ensuring that the country is not left behind its international competitors. Large capital investments will be required to build the infrastructure. To encourage investment, the government must get the regulatory balance right—preserving competition in the market while also giving Internet operators and service providers a framework to innovate and invest. By supporting this investment, U.K. consumers and the U.K. economy can continue to benefit fully from the Internet revolution.

The Internet: A Continuing Transformation

The Internet is transforming every aspect of the way we live in the 21st century. In a very short time, the Internet has become indispensable for communication, information, commerce, and entertainment. With new services launching seemingly every day and mobile connectivity expanding rapidly through smartphones and tablets, the Internet is proving immensely valuable as it permeates life in the United Kingdom.

The U.K. Internet ecosystem is worth **£82 billion** a year, with **mobile connections** accounting for **16 percent** of this.

Total U.K. Internet traffic is expected to increase by an average of 37 percent each year between 2010 and 2015. Although the majority of traffic remains on fixed networks, traffic on mobile networks is growing at a faster rate of 84 percent year-over-year and is expected to account for 11 percent of total traffic by 2015. Mobile access to the Internet accounts for even more time spent browsing, communicating, and transacting than this traffic data suggests, with fixed lines being used to consume bandwidth-intensive services such as video and mobile used more for social media. Indeed, the Internet is increasingly being accessed on mobile devices, whether through mobile connections or Wi-Fi networks, and the next generation of mobile communications (4G or LTE) will continue to shift this dynamic. The rapid adoption of smartphones and tablet devices—penetration has doubled in the past two years—will further increase this growth in coming years.

Although the Internet has a similar value chain structure worldwide, there are differences between geographic regions in both the relative size and strengths of markets on the demand side and even more so on the supply side. Every country has several mobile network operators or online retailers but not every country has an Apple or Google creating and providing products and services for a global market. Even on the demand side, market dynamics vary among countries. For example, consumer Internet access fees have long been lower in Europe than in the United States, with strong regulation of local-loop unbundling driving competition in Europe.

While the Internet's importance is well known, there is little data to demonstrate its value to the U.K. economy specifically and, within that, the value contributed by the mobile industry.

The Findings

Following our study of the global Internet value chain, Vodafone commissioned A.T. Kearney to perform a similar study of the U.K. Internet value chain.[3] This report outlines our findings.

First, a distinction must be made about companies in the Internet value chain—whose primary purpose is providing Internet-related services, such as connectivity, search, online advertising, or end-user device manufacturers—and the broader "e-enabled" companies that may use the Internet as sales and distribution channels. E-enabled companies are those that would exist—and indeed did—even if the Internet had not come about. When combined, the Internet value chain companies and the e-enabled companies make up what we call the Internet ecosystem.

The following examines the Internet value chain from a demand perspective, evaluating adoption in the United Kingdom based on the services being consumed, regardless of origin. We also examine the supply side, evaluating where the United Kingdom contributes economically to the value chain by providing services, whether consumed in the United Kingdom or overseas. Finally, we include a brief discussion of the connectivity market and the "balance of trade" in the Internet ecosystem.

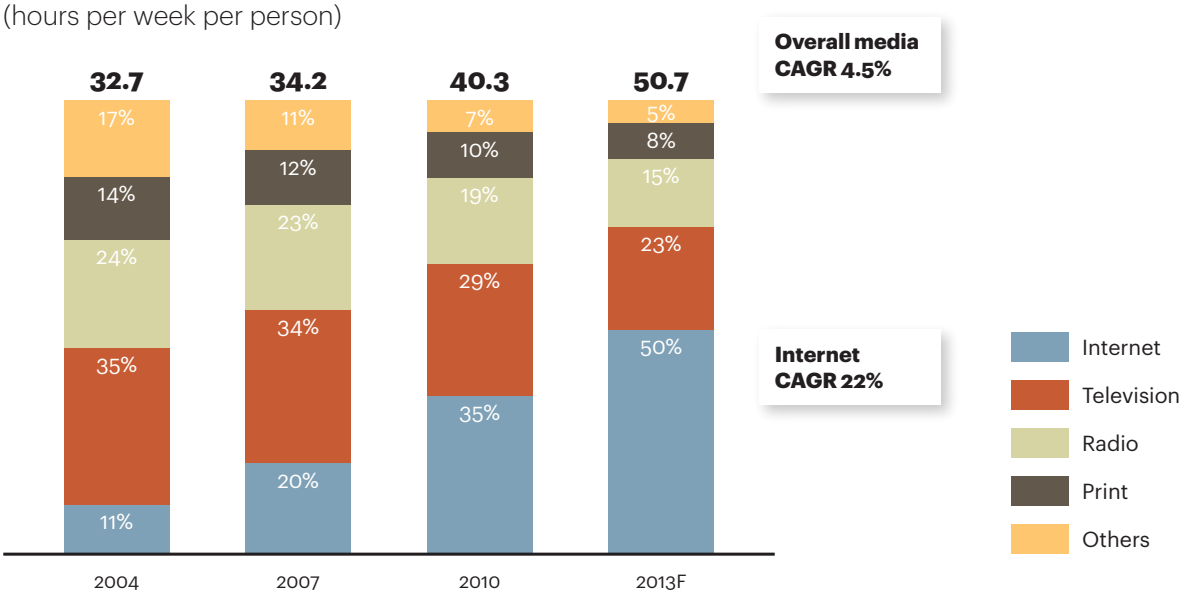
The Demand Side: Internet Adoption in the United Kingdom

The Internet continues to transform communication, entertainment, commerce, and information distribution, and affects almost every aspect of our lives. There are almost daily

Figure 1

The Internet is the most commonly used media channel in Europe

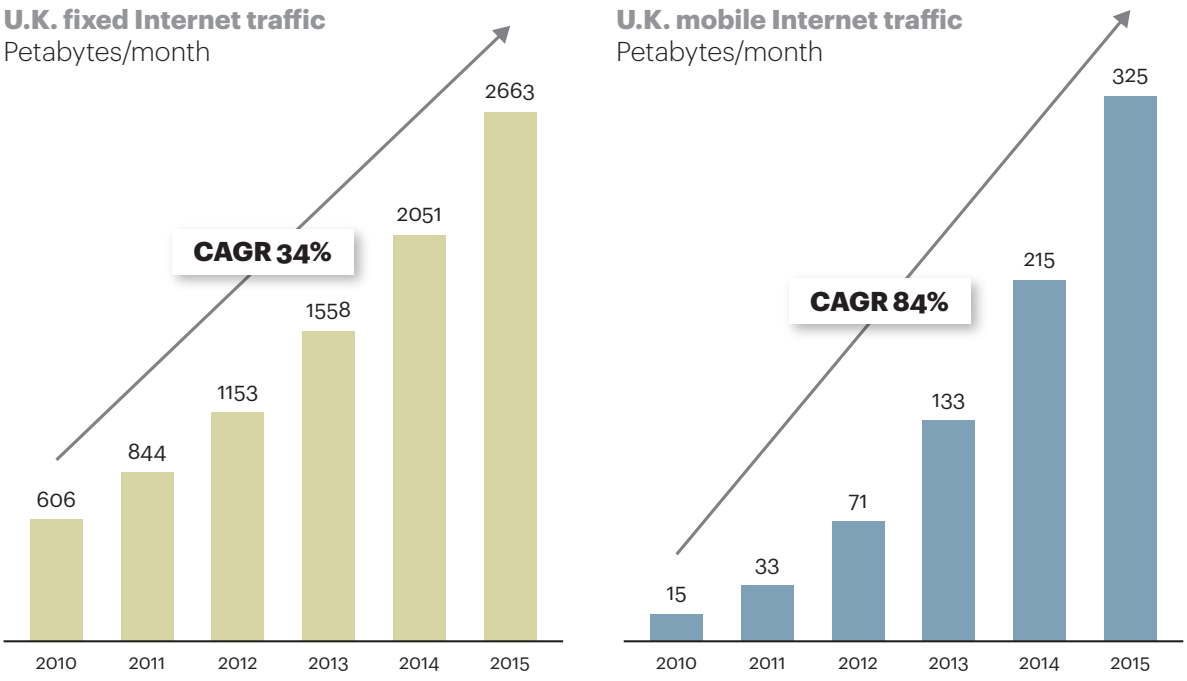
Time spent by media channel, Western Europe
(hours per week per person)



Notes: Includes simultaneous media consumption. "Other" includes video, DVD, and offline video games. Print includes newspapers and magazines.
Source: PricewaterhouseCoopers, Wilkofsky Gruen Associates, Microsoft, Forrester; A.T. Kearney analysis

[3] "Internet Value Chain Economics" is available at www.atkearney.com.

Figure 2
Forecasts for U.K. fixed and mobile Internet traffic



Source: Cisco VNI

examples of this transformation: the launch of *The Daily*, an Internet-only paid-for newspaper; U.K. government departments and local councils posting extensive amounts of budget information online; a website established exclusively for purchasing tickets to the 2012 Olympic Games; and the addition of voice and video calling to Facebook. The way in which we access content is also changing rapidly, demonstrated by the growing sales of Internet-enabled televisions and the rapid adoption of smartphones that offer Web browsing, downloadable applications (called "apps"), and photo uploading.

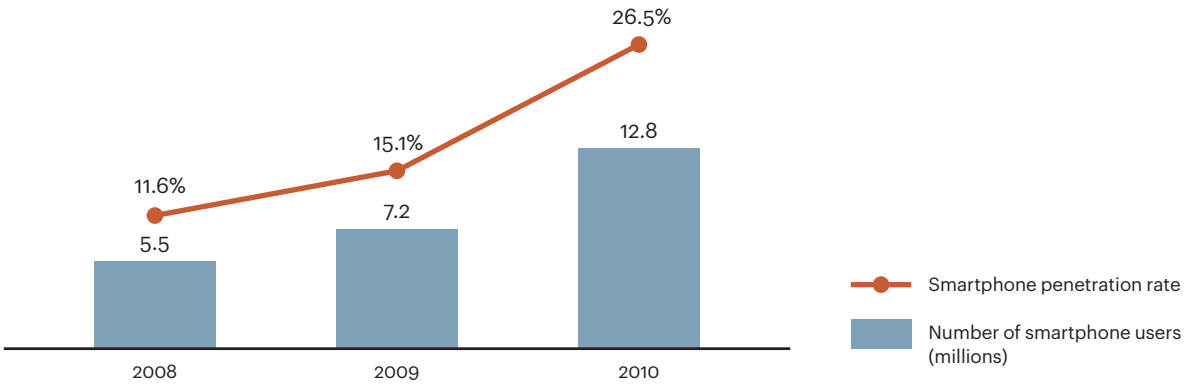
The sheer scale of the shift in media consumption habits is impressive and, of course, has had a major impact on the economics of the content industries. In less than 10 years, the Internet in Western Europe has grown from a minor pastime, taking 11 percent of consumer media time in 2004, to the single largest consumer media channel in terms of time spent in 2010. It will occupy half of all entertainment time by 2013 (see figure 1).

Traffic

The most obvious indicator of the increasing importance of the Internet is the exponential growth in traffic. Total U.K. Internet traffic is forecast to grow from a monthly volume of 621 petabytes (PB) in 2010 (equivalent to roughly 41 million music albums downloaded each day) to 3,000 PB in 2015 (equivalent to almost 200 million albums downloaded per day), a compound annual increase of 37 percent. Although the majority of traffic is on fixed networks, traffic on mobile networks is increasing at an even faster rate of 84 percent year-over-year, and is expected to account for 11 percent of all U.K. Internet traffic by 2015, up from just 2 percent in 2010 (see figure 2). This is likely to increase as the Internet goes mobile with the proliferation of smartphones and tablet devices.

Figure 3

The number of U.K. smartphone users more than doubled between 2008 and 2010



Source: comScore, Mobilens

Access

From a user perspective, mobile access to the Internet accounts for a higher share of time spent browsing, communicating, and transacting than the current 2 percent traffic statistic suggests. The fixed network is still the most prevalent way to consume bandwidth-intensive services such as video-on-demand and catch-up TV, although the next generation of mobile communications (4G or LTE) will begin to shift that pattern. High-bandwidth corporate data transfers to data centers or peer-to-peer file-sharing are typically reliant on fixed networks, but enterprises are also increasingly reliant on mobile communications, and a whole generation of machine-to-machine (M2M) applications is in development.

Video

Video underpins the tremendous growth in Internet traffic. Today around one-third of traffic is video related, and is expected to rise to 70 percent by 2015. The new traffic is a mixture of catch-up services (such as BBC iPlayer and ITV Player), niche online services distributed over the Internet rather than broadcast over-the-air by terrestrial TV or satellites (particularly common with subscription-based sporting events), and video-on-demand services streamed via set-top boxes or directly to web-enabled TVs. Video streaming is more delay-sensitive when compared to file-sharing or web-browsing traffic and poses a considerable challenge for network operators (or Internet service providers) to manage such traffic volumes.[4] The nearly real-time nature of video consumption, combined with the tendency of consumers to concentrate their usage during the same evening time slots, has further increased peak traffic loads, which determine required network capacity and are used by operators and service providers to determine their investment plans.

Smartphones

This trend toward richer and more bandwidth-hungry content may have started on fixed Internet lines, but it is now going mobile. The rapid growth in smartphones, tablets, and data

[4] For a discussion of the economic and technical challenges associated with growth in video traffic, see "A Viable Future Model for the Internet" at www.atkearney.com.

"dongles" is enabling users (both consumers and businesses) to perform many of the same tasks and access the same data on the move as they do when connected to a fixed Internet connection at home or in the office. Smartphones are generally defined as those with additional features over and above basic calling and texting, and include cameras, email, Internet access, and the ability to download and run various apps. Tablets also enable video downloading to watch on the go.

Most traffic on mobile phone networks **is data rather than voice,** thus the need for a high-quality, high-capacity infrastructure.

Smartphone penetration has doubled in the past two years from 12 percent to 27 percent, according to research by the Office of Communications (Ofcom), reflecting that the majority of new mobile contracts come packaged with smartphones (see figure 3). Vodafone reports that 90 percent of its new U.K. contract connections are sold with a smartphone.[5]

The result of this rapid adoption of smartphones is that the majority of traffic on mobile phone networks is data rather than voice, thus increasing the need for a high-quality, high-capacity infrastructure to support these applications.

Social networking

A further driver of mobile Internet usage is the continuing growth of social networking. For example, the number of U.K.-based Facebook users rose nearly tenfold from 3.5 million in April 2007 to more than 30 million in March 2011, according to ComScore. This is 69 percent of the total U.K. online population—one of the highest rates in the developed world.[6] Similarly, Twitter and LinkedIn also report more than 100 percent growth in worldwide users in 2010.

According to Ofcom, social networking is the most commonly used service, accessed by 57 percent of all mobile Internet users.[7] Further, mobile social network users (as opposed to those using a fixed Internet connection) are twice as active as non-mobile users. A 2010 survey of social networking behavior reveals that the average time spent on Facebook over a PC Internet connection is around 32 minutes, while the time spent over a mobile Internet connection is approximately 45 minutes, or 40 percent longer.[8] This is also true for other social networks.

The Supply Side: Internet Value Chain Economics

The U.K. Internet value chain study follows the same basic structure as our global Internet value chain study. Figure 4 illustrates the Internet value chain broken down into five key markets and their segments, with examples of well-known companies within each. Figure 5 lists summary definitions of the markets. For detailed definitions, see the appendix, Report Methodology and

[5] Vodafone Quarterly Results, May 2011

[6] CheckFacebook.com

[7] Ofcom Communications Market Report 2011. Note: some individuals may maintain more than one profile and businesses or groups also use the service.

[8] ComScore, GSMA Mobile Media Metrics, Jan 2010

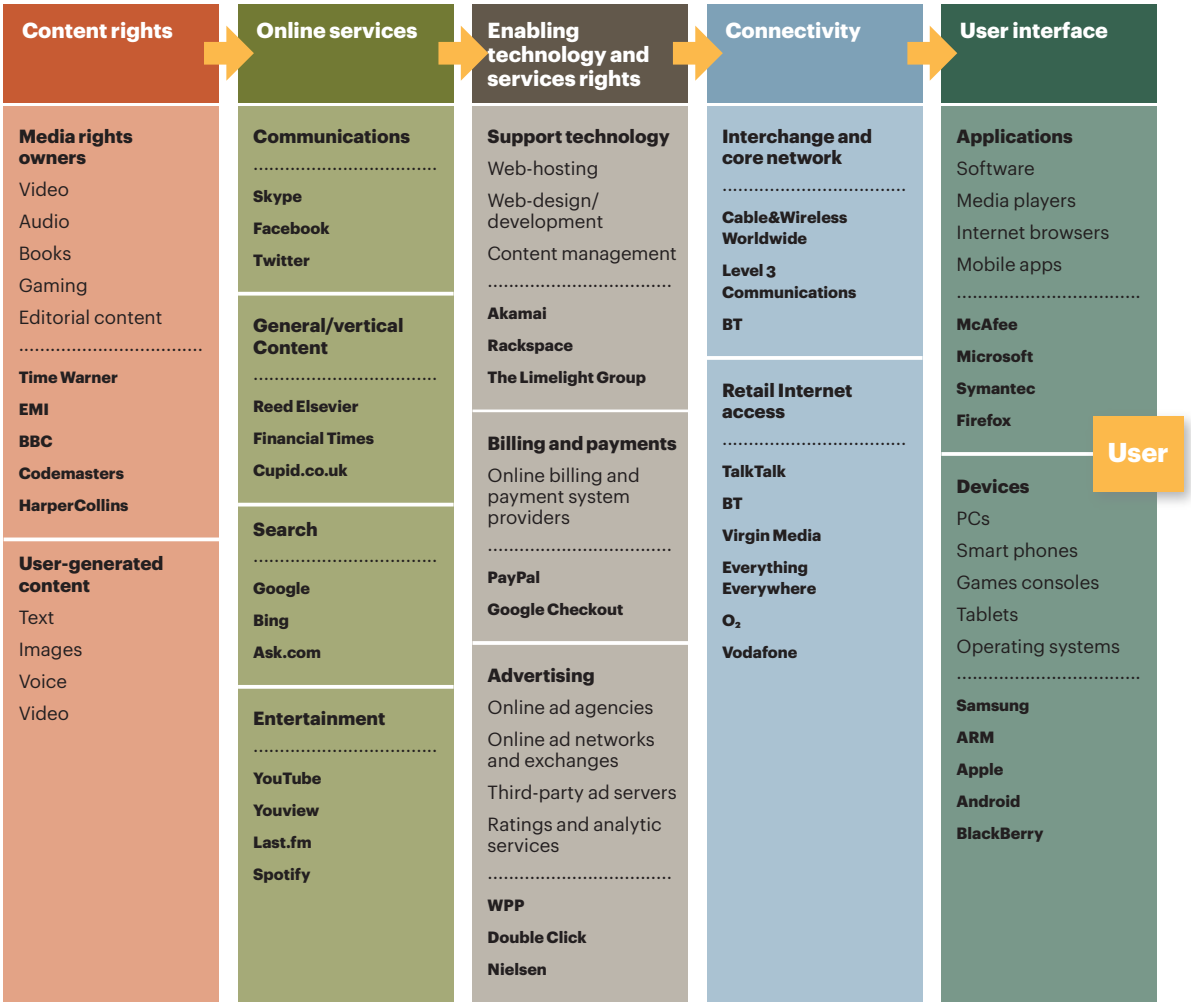
Information Sources, on page 17. As with any such framework, when imposed on reality there are inevitably some grey areas and overlaps. Each segment has been designed to keep these to a minimum and to allow for sensible and useful conclusions to be drawn.

Economic value

We performed our analysis based on consumption data for each market, and included the e-commerce "value-added" of companies selling goods and services over the Internet (not total revenues). Our estimation of the total value of the U.K. Internet ecosystem is £82 billion. Of this, value-added e-commerce comprises 55 percent, compared to the 45 percent that represents the value chain. As figure 6 illustrates, connectivity accounts for 35 percent of U.K. Internet value chain revenues (or 16 percent of the total Internet ecosystem). In other words, for each £1 spent on connectivity, an additional £5.30 of commercial or economic activity takes place.

An alternative perspective is to look at the size of the Internet value chain as a proportion of GDP. (Note: Because we use revenues, whereas GDP is a supply-side measure, this is not

Figure 4
The Internet value chain



Source: A.T. Kearney analysis

Figure 5

Figure 5: Internet value chain definitions and terminology

Content rights	• Involves remuneration to content rights owners for content provisioned over the Internet • Typically includes media companies and organisations (such as BBC, Harper Collins, Codemasters)
Online services	• Encompasses the range of on-line services accessed by Internet users, including communications, search engine, entertainment, and gaming platforms
Enabling technology and services rights	• Facilitates the technical and commercial functioning of the Internet • Is "invisible" to the majority of users
Connectivity	• Includes all elements of the Internet communications infrastructure, including fixed access, Wi-Fi, mobile access, and the core and transit services used to link ISP networks together
User interface	• Includes the devices and software necessary for user interface with the Internet, including PCs, smartphones, and mobile apps and operating systems

Source: A.T. Kearney analysis

strictly a like-for-like comparison; however, it does highlight some interesting points.[9]) Of the United Kingdom's total £1.45 trillion GDP, the Internet value chain represents 2.6 percent of GDP, and the e-commerce conducted over it a further 3.1 percent (see figure 7). Comparing this to the equivalent numbers for the global Internet value chain highlights that the U.K. Internet value chain makes up a significantly larger proportion of GDP, while the value added by e-commerce also constitutes a larger share of GDP, especially for business-to-consumer (B2C).

Within e-commerce, business-to-business (B2B) e-commerce as a proportion of GDP in the United Kingdom is similar to the global number (2.35 percent versus 2.28 percent), but the United Kingdom has a much stronger B2C e-commerce sector, representing three times the global average.

There are a number of possible causes for the relative strength of consumer e-commerce in the United Kingdom:

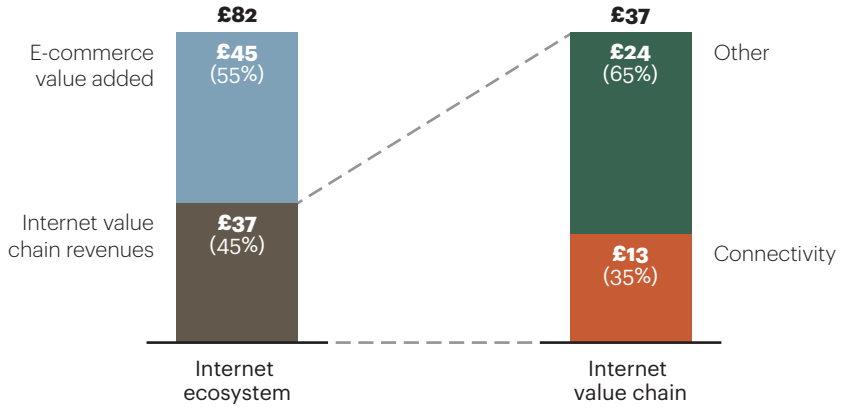
- **Strong adoption.** The United Kingdom is identified in a number of studies as a keen adopter and consumer of Internet-related services. A Forrester report on online shopping highlights that 70 percent of the U.K. population shops online, the highest level in Europe (together with Sweden and The Netherlands), compared to just 34 percent in Italy and Spain.[10] In the Digital Agenda Scorecard, published by the European Commission in May 2011, the United Kingdom ranks second, closely behind Denmark among the 27 member states, with 67 percent of its citizens adopting e-commerce. However, of enterprises purchasing and selling online, the United Kingdom ranks fourth, significantly behind Sweden, Belgium, and Denmark.
- **Competitive market.** The United Kingdom's fiercely competitive mobile and fixed telecom sectors has driven down consumer prices (offering free dial-up access in the early days) and promoted broader access to the Internet, especially mobile.

[9] See the appendix for a comparison of GDP calculations with other studies.

[10] European Online Retail Forecast, Forrester Feb 2011

Figure 6
U.K. Internet ecosystem breakdown

£ billions, 2010



Source: A.T. Kearney analysis

- **U.S. presence.** With a common language and consumers with a similar propensity to use credit cards and trust online transactions, many U.S. online retailers opened U.K. stores early in the Internet's development. This created a virtuous circle of online consumers and retailers driving faster adoption.

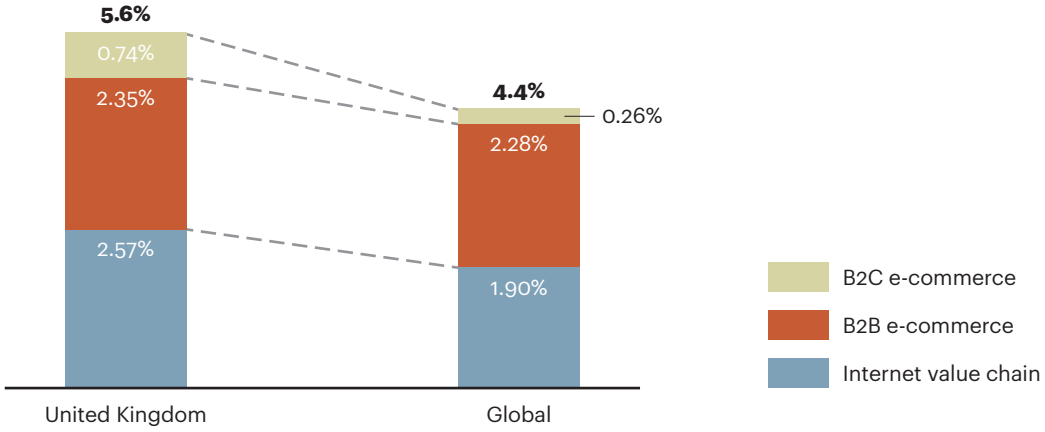
The markets

Looking more closely at the markets that make up the actual Internet value chain, figure 8 shows the £37 billion broken into its various segments, with the area of each proportional to its revenues.

The largest market is connectivity, which at £13 billion in revenues represents 35 percent of the U.K. Internet value chain. The market for online services, is slightly smaller at £11 billion and

Figure 7
Global and U.K. Internet ecosystems as proportion of GDP

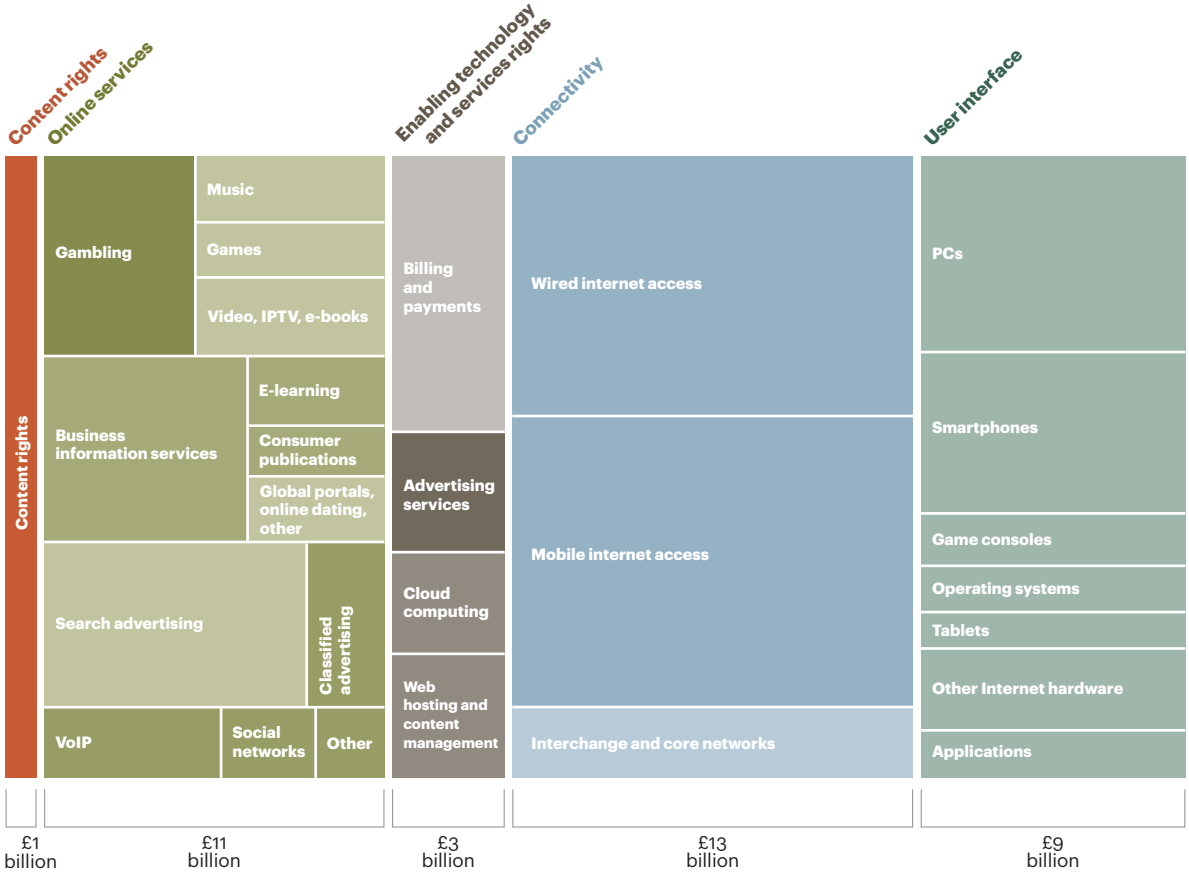
% of GDP (2010)



Note: B2C = business-to-consumer; B2B = business-to-business
Source: A.T. Kearney analysis

Figure 8

Components of the U.K. Internet value chain



Note: The size of each box indicates its relative size. The lighter shaded boxes are ones where the United Kingdom is less well-represented on the supply side (as opposed to consumption). All boxes under user interface are lightly shaded.

Source: A.T. Kearney analysis

includes search advertising, gambling, and other entertainment and information services. The user interface market represents a further £9 billion, a large proportion of which comes from the purchase of smartphones and, increasingly, tablets. These are the fastest-growing markets and highlight the appeal of mobile Internet services. Enabling technologies and services, and content rights make up the remainder.

It is worth noting that although online services are perhaps the most obvious part of the value chain to the consumer, the size of the connectivity and user interface markets highlight the prominence of the infrastructure that delivers online services. (Of course, many user interfaces such as PCs and smartphones have other purposes besides online services.)

Furthermore, user interface devices and connectivity services open up access to a wide range of free services and content not captured in our revenue-based analysis but valued by consumers. For example, BBC iPlayer is free to the general public and is steadily rising in popularity, now accounting for about 10 percent of U.K. Internet traffic. Also, in the public sector, the growth of e-government initiatives—also free to the public—is helping to reduce the cost of doing business in the United Kingdom and leading to more economic activity and investment.

Supply side economics

As explained in the methodology, our quantification approach is based on the consumption of services, regardless of their "origin."[11] It is interesting, however, to consider the supply side and which markets shown in figure 8 have significant impact on creating employment and supporting services within the United Kingdom.

In user interface, the United Kingdom has very little presence beyond the sale of devices. The main exception is U.K.-based ARM, a world leader in its field and whose chipset designs are used in most smartphones and even tablets such as the iPad.

In online services, the country is relatively stronger. For example, in the business information services segment, companies such as Thomson Reuters and Reed Elsevier have a strong U.K. presence and compete on a global basis. Not surprisingly, given the U.K.'s appetite for online shopping, several successful online retailers serve both the domestic and international markets. Online grocery shopping is particularly developed in the United Kingdom, while internationally successful retailers include The Book Depository, an online book retailer with the largest range of titles in the world.[12]

Mobile revenues are largely expected to **remain flat** at a time when the **traffic** being carried **is expected to increase five-fold.**

In the absence of company-internal data, which would allow us to assign a more precise value to supply-side activity, we cannot quantify the balance of trade for the country in the Internet value chain. Given the imbalance on device and software manufacture, however, the United Kingdom is likely a net importer. Growth in its content and application development markets, where strong players exist, would represent an opportunity to rebalance. Innovation initiatives include promoting East London Tech City and other opportunities exist across the broader value chain.

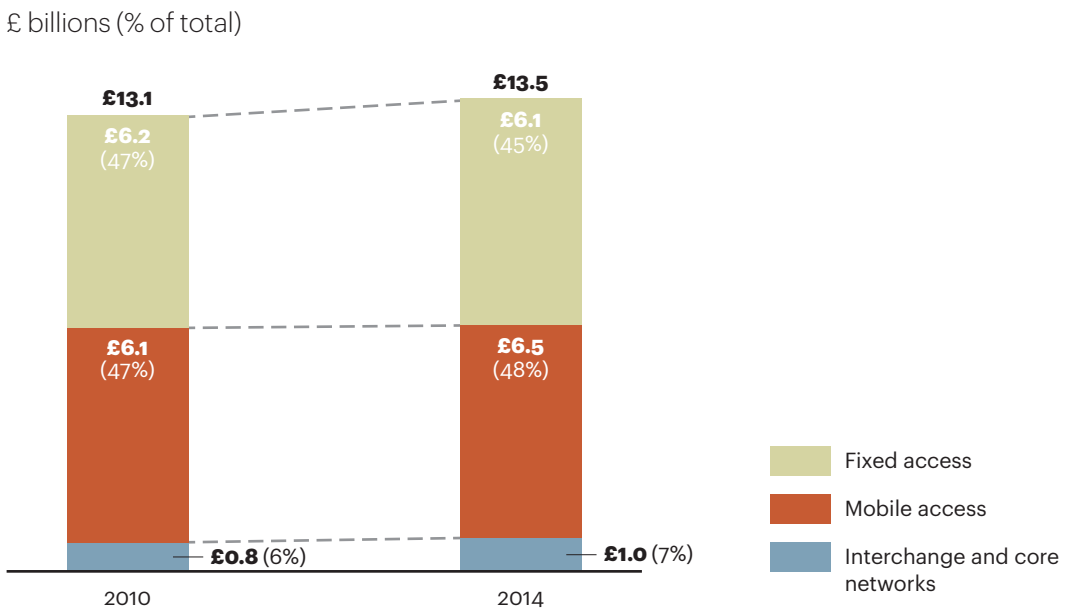
The Connectivity Market

Connectivity is not only the largest market in the U.K. Internet value chain, it also retains a strong local element, since it effectively builds, operates, and sells physical communications services within a country. Here the United Kingdom has a competitive and highly developed domestic market for fixed and mobile services, and some of these companies have become global players. For example, the U.K. is birthplace to three of the leading international mobile operator brands (O2, Orange, and Vodafone) although two are now owned by companies with overseas headquarters.

[11] Determining "origin" is difficult. For example, a Google search uses an algorithm developed in California, is on a server hosted in numerous countries, and is supported by advertising revenue from many others.

[12] Amazon acquired The Book Depository in July 2011.

Figure 9
The breakdown of U.K. connectivity revenues



Source: IDC; A.T. Kearney analysis

Within the connectivity market, spending on mobile data accounts for approximately the same proportion as fixed.[13] In fact, the unit cost of a mobile Internet connection is generally less than for fixed. However, a typical household may have two or more mobile contracts compared to one fixed broadband connection shared by multiple residents.

Figure 9 depicts the breakdown and forecast of U.K. connectivity revenues. What is striking about this forecast—which is in line with most industry forecasts and operators' investor guidance—is that mobile revenues are largely expected to remain flat at a time when the traffic being carried is expected to increase five-fold.

Another characteristic of the connectivity market relevant to the wider U.K. economy is the capital-intensive nature of telecom networks, especially when considered against the other markets within the Internet value chain (see figure 10). In prior reports mobile was more capital-intensive than fixed on a steady state basis.

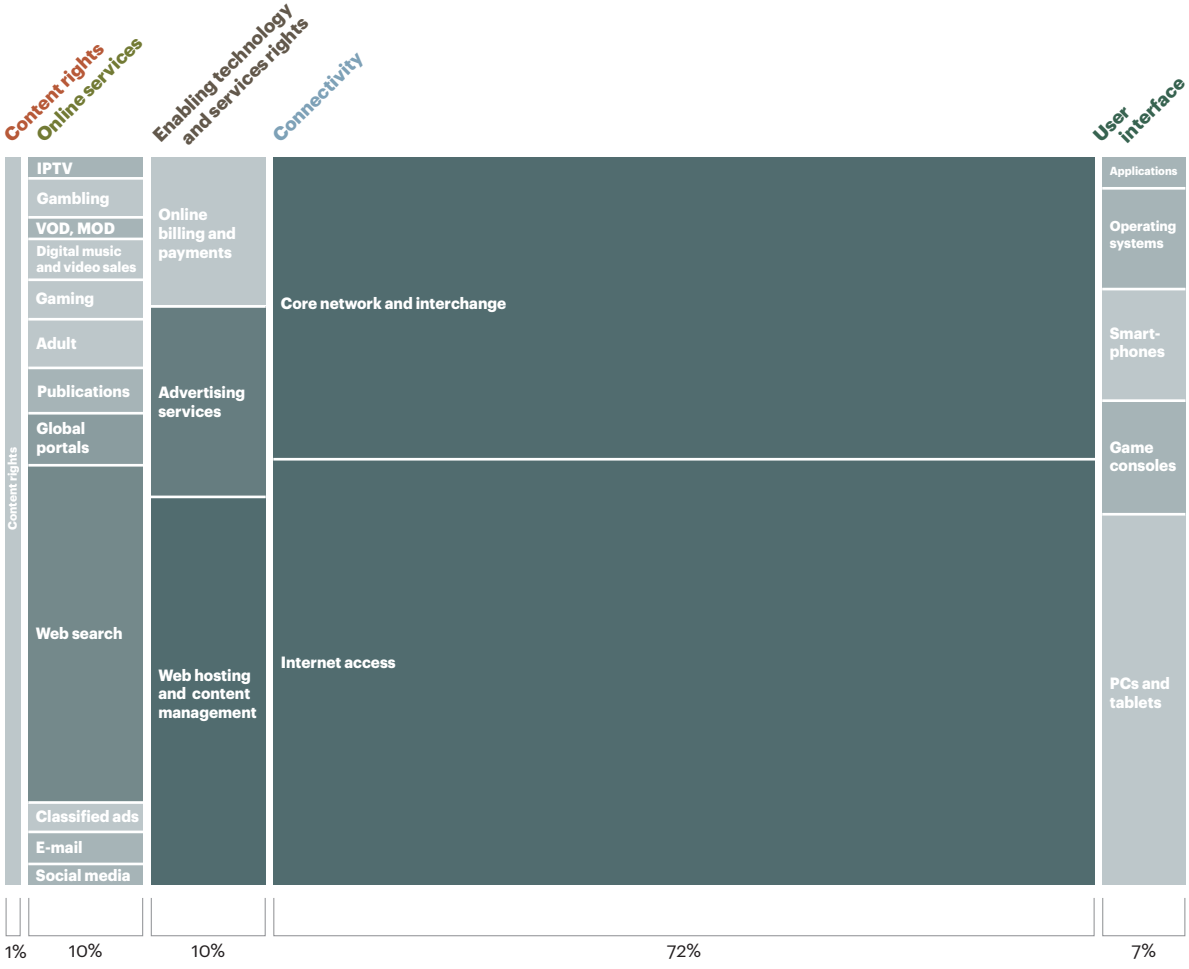
Globally, the connectivity market spends 72 percent of capital expenditures (capex) in the value chain, and could well represent an even greater proportion of the total investment in the United Kingdom because of the smaller proportion of capital spent on the development or manufacture of end-user devices and software. Clearly, investment in the connectivity market underpins the future of the full value chain.[14] Although a portion of this investment is used to buy hardware and equipment to build the networks, a significant amount is for installing and commissioning the network, which supports many high-skilled jobs across the country for operators and their vendors.

[13] Judgment is used here, since most mobile tariffs are a bundle of minutes and data usage for a fixed monthly fee; this is a widely accepted allocation of revenues-to-usage.

[14] Study is for Internet-related capex only; total investment in telecom networks is much higher when factoring investment in mobile voice, maintenance of legacy systems, and the provision of non-Internet business networks.

Figure 10

Capital expenditures breakdown by segment



Notes: The size of box indicates relative capex value. This analysis was conducted at a global level due to the complexities of separating the location of revenues from the capital investment, but we believe it is indicative of U.K. investment. MOD is music-on-demand. VOD is video-on-demand.

Source: A.T. Kearney analysis

Because publicly available data on the supply side aspect of the Internet proved to be scarce, further research would be useful, not least so that policymakers understand the United Kingdom's Internet ecosystem as input to economic policy.

The Internet's Widening Reach

The Internet continues to grow in usage, traffic, and overall social and economic importance as a medium of communication and distribution of content and services. Every day brings richer content and more sophisticated devices that enable more people to access more information and services in more places.

The U.K. Internet value chain comprises a range of companies that contribute to delivering the services and content to end-users. Each is an important component in its own right. In commercial transactions, more money is spent on e-commerce than on actual Internet services, which reflects the utility of a universal platform. The value chain is proving to be the source of many new business models and online services.

And, although the basis of the connectivity market—fibres, wires, and radio waves—is mostly invisible (especially when they work properly), they form a most fundamental building block. Spending on connectivity services represents just 16 percent of the overall total ecosystem and 72 percent of capital spending within the Internet value chain.

This points to an emerging issue that deserves further research: The U.K. Internet balance of trade. U.K. consumers have a voracious appetite for consuming online services and Internet-based shopping. But the country's weak economy harms its position as a supplier in the global Internet value chain. As the Internet grows and encompasses more activities, it will be vital to address the supply-demand imbalance.

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Appendix

Report Methodology and Information Sources

Definitions

The Internet value chain includes all activities that exist as a direct result of Internet usage. It includes five markets: content rights, online services, enabling technology and services, connectivity, and user interface. These five markets are broken down further into 13 strategic segments, and each is broken down into 40 more detailed service categories. We did not distinguish between revenues generated by consumers and businesses, although, in some cases, revenues are generated only in one segment. For instance, video-conferencing revenues are almost entirely generated by businesses, while entertainment revenues stem predominantly from consumers.

The Internet ecosystem encompasses all of the Internet value chain in addition to the e-commerce on top of it. Our calculation of e-commerce does not include the entire value of all goods and services sold over the Internet, but rather the "value added" from those companies selling goods and services over the Internet. We have also calculated e-commerce values separately for B2C and B2B markets.

Market size analyses

Market size is based on gross revenues, except where otherwise stated. Revenues generated from other companies in the value chain (for example, through commissions, fees, or sales) are not distinguished from those generated from companies outside the value chain, except where noted. Therefore, this is not a value-add analysis of the Internet economy, so there can be overlaps among revenue categories. For example, revenues from content rights overlap with revenues from online services.

Other U.K. market size analyses

Similar studies have focused on the value of the Internet to the U.K. economy, most recently a report by the Boston Consulting Group (BCG). That report estimates that the Internet contributed £100 billion to the U.K. economy in 2009, or roughly 7.2 percent of GDP. These estimates differ from ours due to differences in methodology and assumptions. For example, the BCG study is based on the expenditure method of GDP, looking at the final value of Internet-related goods and services stemming from the combination of consumer expenditure, investment, government expenditure, and net exports. Our methodology, by comparison, is based primarily on revenues generated by the various companies in the Internet value chain.

Market descriptions

E-commerce

Segment	Description
B2C e-commerce	Websites or applications that sell goods or services over the Internet
	Value added is based on total transaction value, less the direct cost of goods or services sold and fulfilment. The percentage to be subtracted is an estimate based on company reports from select leading operators
B2B e-commerce	Websites or applications that permit business-to-business purchasing, selling, and exchanging of goods and services over the Internet. Excludes e-commerce that occurs via computer networks other than the Internet, such as electronic data interchange (EDI)
	Value added is based on total transaction value, less the direct cost of goods and services sold and fulfillment. The percentage to be subtracted is an estimate based on company reports from select leading operators.

Content rights

Segment	Description
Media rights owners	Market size is based on the percentage of revenues made by online service paid to content rights owners, either as: — Revenues from digital product sales after commission — Content acquisition or license costs
	Online service categories in scope are: — Entertainment — General and vertical content sites — Search and classified advertising — Communications — Enabling technology and services — Connectivity — User interface
	For each category of online services, we estimated the percentage of total online revenues that would be subject to a revenue share with the corresponding content rights owners, based on publicly available
User-generated content	Revenue received by user-generated content is not included in the analysis—but is negligible as user-generated content is rarely remunerated

Online services

Segment	Category	Description
Entertainment	Video	Digital downloads: websites that sell or rent digital film entertainment products via downloads
		Video-on-demand (VoD): websites providing audio-visual content through ad-funded or subscription streaming services
	IPTV	Television delivered through an IP connection
	Music	Digital downloads: websites that sell or rent music via downloads
		Music-on-demand (MoD): websites providing audio content through ad-funded or subscription streaming services
	Games	Casual games: websites providing Internet-hosted games through an interactive streaming service; users are generally not required to purchase software (either physical or download)
		Non-casual games: websites and applications providing the ability to play console or PC games on the Internet, usually with other gamers, through an interactive streaming service; users generally must purchase software (either physical or download); includes subscription revenue and sale of in-game virtual items
		In-game advertising: advertising that occurs as a part of the online gaming experience
	Gambling	Websites providing all types of online gambling services, including betting and casino
	Digital books	Websites providing the ability to purchase books via downloads
General/vertical content sites	Global portals	Select general interest portals and website operators with a global scope, including Yahoo!, Microsoft, AOL, IAC, and their subsidiaries. Includes display ad revenues and fees from all branded product types (for example, consumer webmail)
		Excludes search ad revenues and casual game revenues, which are accounted for in other categories
	Email marketing	Direct solicited email marketing to customers
	Consumer publishing	Websites operated by newspapers and magazines, usually with similar branding and content
		Includes ad revenues only; subscription revenue is rising but remain a small proportion of publishing
	Online dating	Websites offering matchmaking and communications services focused on developing romantic relationships
	E-learning	Websites and applications that form part of the learning process for both corporate and non-corporate markets
	Business information services	Websites and applications that provide information services to businesses
		Includes financial information (such as securities and economic data), marketing information (such as customer surveys and sales tracking), and industry-specific information (such as market share and profitability)

Online services (cont.)

Segment	Category	Description
	Other (ad-funded) content destinations	Other ad-funded websites and applications
Search	Search ad revenues	Search engines providing the ability to find information and other websites on the Internet
	Classified ad revenues	Websites providing categorised, searchable lists of organisations—typically consisting of "Yellow Pages" publishers' websites
Communications	VoIP	Companies providing voice communication transmission services over IP networks
		Includes VoIP subscription and off-net traffic spending, but excludes Internet access charges
	Email	Websites and applications that allow the sending, receiving, and storage of electronic mail
		Includes only enterprise email services; revenues from consumer email services are assumed to be negligible
	Social networks	Websites and applications focused on facilitating person-to-person communication through a variety of channels
		Includes ad and paid revenues
	Instant messaging	Websites and applications that provide one-to-one, one-to-many, or many-to-many real-time text-based communication
		Includes only enterprise instant messaging revenues. Revenues from consumer instant messaging services are assumed to be negligible.
	Video conferencing	Websites and applications that allow users in multiple locations to interact via video and audio transmissions simultaneously
		Includes only business video conferencing. Revenues from consumer video conferencing is assumed to be negligible.
	M2M communication	Refers to technologies supporting wireless communication between machines
		Includes only cellular M2M technologies

Enabling technology and services

Segment	Category	Description
Billing and payments	Online billing and payment providers	Consists of payment processing for B2C e-commerce online transactions
		Revenues are based on B2C e-commerce total transaction value multiplied by the estimated percentage accruing to online billing and payment providers
Advertising	Online ad agencies	Companies providing services to create, plan, and execute online advertising
		Revenues are based on display online ad spending multiplied by the estimated percentage retained by online ad agencies
	Online ad servers	Companies providing the technology and service to place online advertisements on websites
		Revenues are based on total online ad spending multiplied by the estimated percentage retained by online ad servers
	Ratings and analytics services	Companies offering data and analytics services on Internet user and usage metrics
Support technology	Web hosting and content management	Web hosting: companies that provide services that allow individuals and organisations to store their websites on their servers and make them available on the Internet
		Content management: companies that offer servers that allow online services to optimise the flow of content through the Internet (primarily content delivery networks)
	Web design and development	Companies that create and code Internet pages
	Cloud computing	Companies that provide services and applications that are hosted over the Internet
		Includes software-as-a-service (SaaS), platform-as-a-service (PaaS), infrastructure-as-a-service (IaaS)

Connectivity

Segment	Description
Interchange and core networks	Core networks: companies that own and operate the core telecommunications network, providing wholesale services to Internet service providers (or ISPs, which may be a division of the same company as the core network providers, but typically with some degree of regulatory separation)
	Interchange: operators providing "super exchanges" of Internet traffic between core network operators; a limited number of standalone and independent interchange operators exists besides level 3 communications and XO communications (both U.S. operators); in most major markets, interchange is provided by large network operators
Retail Internet access	Companies providing access to the Internet, typically known as ISPs
	Includes both fixed and mobile Internet access; excludes charges for voice calls, TV, and fixed-line rental

User interface

Segment	Category	Description
Devices	PCs	Includes both desktops and laptops; excludes tablet PCs
		Based on total sales multiplied by the estimated percentage of PC time spent online
	Smartphones	Advanced mobile phones characterised by Internet access (normally high-speed or non-WAP access) and operating systems that allow the running of applications and software
	Game consoles	Personal gaming devices and software with the ability to connect to the Internet
		Based on total sales multiplied by the percentage of gamers who play online
	Operating systems	Software platforms on top of which other application programmes are run; excludes mobile operating systems
		Based on total sales multiplied by the estimated percentage of PC time spent online
	Tablets	Personal computing devices characterised by touchscreen interfaces (or stylus-enabled screens) that run standard or lightly adapted operating systems and normally incorporate Internet access
	Other Internet hardware	Peripherals allowing other devices to connect to the Internet and enabling usage of online services (including modems, routers, and webcams)
Applications	Software	Other Internet software and tools; excludes mobile apps
	Mobile	Internet applications that run on smartphones and other mobile devices

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