

Appendix A: Price benchmarking

A.1 Introduction

There is a constant debate in the communications industry around how to capture the difference in prices between countries. We have constructed a new methodology that we believe better reflects the prices consumers actually pay, and which also takes into account connection costs and equipment costs.

The prevalent current approach is to examine services on a platform-by-platform basis (e.g. fixed-line, broadband, mobile, pay TV). For each of these services, a 'basket' of usage is constructed, or sometimes a number of baskets, for example 'high user' and 'low user'. These baskets contain usage profiles (e.g. for fixed-line: line rental, number of local / national / international / to mobile minutes of use per month, etc.). The baskets are then matched against tariffs for each country to arrive at a notional monthly price, and the prices are compared between countries.

The aim of our new study is to examine a new methodology for benchmarking the prices of communications services. There are three main reasons for considering a new approach:

- It is increasingly difficult and inaccurate to consider prices of communications services on a strict vertical market basis (i.e. platform-by-platform basis). The proliferation of technology and marketing convergence has led to "bundled" pricing of services across multiple platforms, making it difficult (if not impossible) to separate out individual service prices.
- Most current benchmarking models do not account for a 'whole cost of ownership' approach. This means that elements such as equipment costs and connection fees are rarely captured. However, these costs are often significant, and are clearly crucial enablers of communications services.
- There is a particular issue in mobile telecoms price benchmarking analysis which has hitherto been widely ignored: in the US (and in a small number of other countries) mobile users pay for calls that they receive as well as for calls that they make – a system known as 'called party pays' or 'receiving party pays'. This issue has up to now made mobile price comparisons between the US and other countries both difficult and somewhat meaningless.

This price benchmarking study is intended to more accurately analyse and reflect the way residential customers buy services, and to reflect the prices they pay in the real world. Each of the issues noted above will be addressed in our methodology. We will then apply the methodology to a limited price benchmarking analysis of five countries: the UK, France, Germany, Italy and US.

We believe that the approach and results that are the outputs from this study should serve as a credible 'beta version'. Our intention is to further refine the methodology, and to increase the number of countries included in the analysis. In order to do both of these things, we invite other interested parties to work with us to take the project to its next level of evolution.

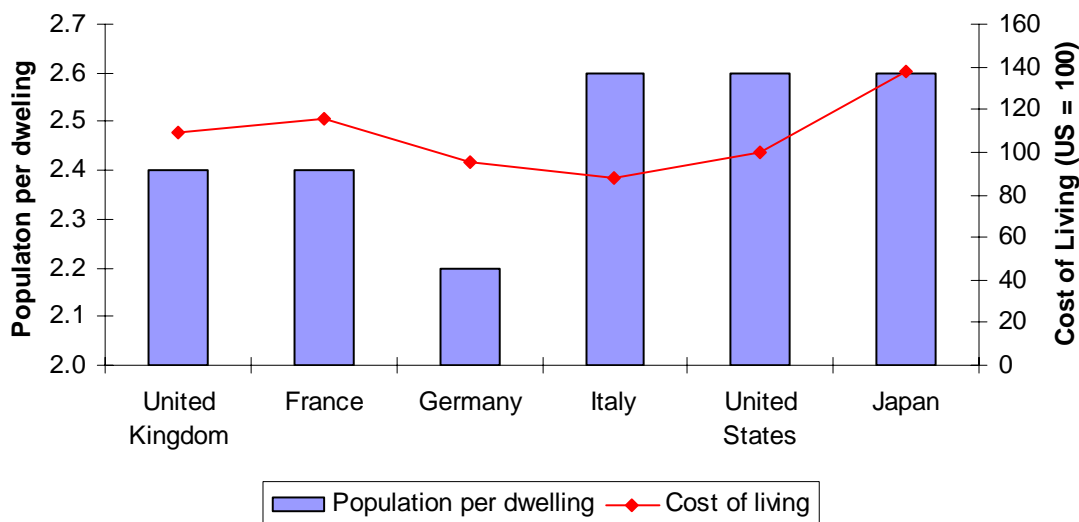
A.2 Methodology

In conducting this benchmarking study, we have adopted a platform-neutral approach by considering the total communications needs of each representative group, rather than by analysing their usage on a platform-by-platform basis (e.g. fixed-line, mobile, broadband etc.). We have also chosen to analyse communications usage on a per-household basis, rather than on an individual basis, since many communications services (such as broadband and pay TV) are used by households rather than by individuals. To this end, we have divided consumers into four separate household categories that are broadly representative of the countries' main consuming groups.

Geographic focus

The initial study concentrates on the following five countries – the United Kingdom, France, Germany, Italy and the United States. These countries demonstrate broadly similar socio-demographic, economic and communications usage characteristics; some broad parameters such as population per dwelling and cost of living suggest that an economically fair comparison can be made.

Figure 6.1: Demographic characteristics of core countries



Source: *Economist World In Figures 2005*

UK market as template

We have used detailed UK market data to provide the underlying assumptions for the household average usage patterns, and have then extrapolated other usage patterns from this average. Data on the separate communications markets support the thesis that the UK is a meaningful base point for these assumptions.

Demographics classifications

For the purposes of this study, we have made reference to the following social grade definitions, demographics classifications and geodemographic classes:

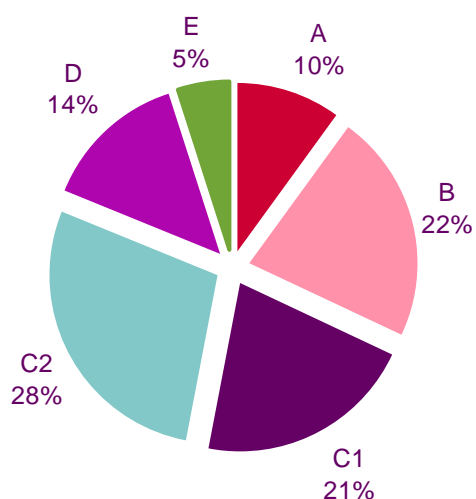
Figure 6.2: Social grade classifications

Social Grade	Social Status	Occupation
A	Upper middle class	Higher managerial, administrative or professional
B	Middle class	Intermediate managerial, administrative or professional
C1	Lower middle class	Supervisory or clerical, junior managerial, administrative or professional
C2	Skilled working class	Skilled manual workers
D	Working class	Unskilled manual workers
E	Those at lowest level of subsistence	State pensioners or widows (no other earner), casual or lowest grade workers

Source: ONS

According to ONS data, the 2004 UK split of population by social grade was as follows:

Figure 6.3: UK population by social grade



Source: ONS

Household types

Having considered the UK household composition patterns and cross-checked against other countries for consistency, we have constructed an initial four household types for analysis, with the following definitions:

Household 1 - Two Adults, No Children, Social Grade B
Household 2 - Two Adults, Two Children, Social Grade C2
Household 3 - One Adult, One Child, Social Grade D
Household 4 - Two Adults (retired), No Children, Social Grade E

Data composition

We have gathered detailed data on the baskets of communications services purchased for each of the household types. These data serve to reflect the typical communications use of each of our four representative households, and they are broken down into the following categories:

Voice calls within the home:

Services

- Voice calls in home to national destinations (minutes)
- Voice calls in home to local destinations (minutes)
- Voice calls in home to international destinations (minutes)
- Voice calls in home to mobile destinations (minutes)

Mobility services:

Equipment/installation

- Type of premium contract handset
- Installation/connection charges for premium mobile

Services

- Line rental contract for premium mobile
- Voice calls from premium mobile to national fixed/mobile (minutes)
- Voice calls to premium mobile from national fixed/mobile (minutes)
- Voice calls from premium mobile to international fixed/mobile (minutes)
- Inbound/outbound roaming calls to/from premium mobile to/from neighbouring country (minutes)
- SMS messages from premium mobile
- MMS messages from premium mobile

Equipment/installation

- Type of standard contract handset
- Connection charges for standard mobile

Services

- Line rental contract for standard mobile
- Voice calls from standard mobile to national fixed/mobile (minutes)
- Voice calls to standard mobile from national fixed/mobile (minutes)
- Voice calls from standard mobile to international fixed/mobile (minutes)
- Inbound/outbound roaming calls to/from standard mobile to/from neighbouring country (minutes)
- SMS messages from standard mobile
- MMS messages from standard mobile

Equipment

- Standard prepay 1 handset

Services

- Voice calls from prepay mobile 1 (minutes)
- Voice calls to prepay mobile 1 (minutes)
- SMS messages from prepay mobile 1
- MMS messages from prepay mobile 1

Equipment

- Standard prepay 2 handset

Services

- Voice calls from prepay mobile 2 (minutes)
- Voice calls to prepay mobile 2 (minutes)
- SMS messages from prepay mobile 2
- MMS messages from prepay mobile 2

TV services:

Equipment/installation

- Standard TV set
- Premium TV set
- Free-to-air DTV decoder
- Type of standard set top box
- Type of premium set top box
- Installation/connection charges for set top box

Services

- Pay TV (Standard Package)
- Pay TV (Premium Package)
- TV licence fee

Internet services:

Equipment/installation

- Number of basic PCs
- Number of premium PCs
- Installation/connection charges for broadband

Services

- Dial-up internet
- Broadband (Standard)
- Broadband (Premium)

General assumptions underpinning basket composition

We have examined general UK, European and US communications usage patterns in our construction of the underlying assumptions from which each of the household usage baskets is generated. (We have not analysed Japan and China, largely owing to the difficulty of obtaining English language tariff information in the available timeframe). Most of our data have come from the UK, but we have used high-level knowledge of usage in other countries to modify our assumptions where appropriate. For instance, pay TV usage is higher in the UK than most of the other countries in our analysis, so we have adjusted our UK data downwards appropriately, better to reflect usage across all countries.

Calls within home:

- Total calls based on UK average call volumes/line of 303 minutes/month (source: Ofcom CMR 2006)
- Split of calls by national/local/international/to mobile based on average UK split for 2005 of 25.3%, 61.1%, 3.3% and 10.3% respectively (source: Ofcom CMR 2006)

Mobility services:

- Number of subscriptions per household based on UK average of approx 2.7 subs/household (source: Ofcom CMR 2006)

- Mobile call volumes based on UK average call volumes from Q4 2005 of 103 outgoing minutes/month and 79 incoming minutes/month (source: Ofcom Q4 2005 telecoms data tables & Ofcom CMR 2006)
- Mobile outgoing voice calls to fixed/other national mobile based on average call splits for Q4 2005 of 90% of all outgoing minutes (source: Ofcom CMR 2006)
- Mobile outgoing voice calls to international based on average call splits for Q4 2005 of 1.4% of all outgoing minutes (source: Ofcom CMR 2006)
- Mobile roaming voice calls based on average roaming volumes/sub for Q4 2005 of 1.9 minutes (source: Ofcom telecoms data tables, Q4 2005)
- Note: in order to more accurately account for mobile roaming, we have used a blend of both CMR 2006 data and Ofcom telecoms data tables.

TV services:

- Number of premium/basic TVs per household based on UK average of approx 2.7 TVs/household (source: Ofcom CMR 2006)
- Pay TV subscriptions/household based on UK average of 43% taking pay satellite or pay cable on main set in 2005 (source: Ofcom CMR 2005), reduced to 35% on account of lower take-up in other countries
- Free-to-air DTV services/household based on UK average of 18% taking DTV on main set in 2005 (source: Ofcom CMR 2006)

Internet services:

- Number of households with PC based on UK 2005 average of 65% (source: Ofcom CMR 2006)
- Internet take-up levels based on UK 2005 average of 60% (source: Ofcom CMR 2005)
- Broadband as % of internet connections based on Q1 2006 UK average of 69% (source: Ofcom CMR 2006)

Basket composition for household types

Having formed our underpinning assumptions, we have adjusted usage patterns for each household type, such that all four households, taken together, approximate to the usage average. It is worth noting that the 'super-user' Household 1 would be underweighted in the average of the four households, since there is a smaller proportion of these types of households in each of our target countries.

Household 1 - Two adults, no children, social grade B

Household 1 consists of a two young professional working adults with an above-average disposable income to spend on communications services. They are sophisticated users of technology, likely to upgrade their equipment more frequently than the typical user.

Services and usage profile

- Below average call minutes from the home (2005 UK monthly average 300 mins/month), reflecting
- Significantly above average call minutes from mobile to national, on-network, off-network and international
- Significantly above average mobile roaming call minutes
- Above average MMS and SMS messaging
- Subscribe to premium pay TV package
- Subscribe to premium internet access package
- TV licence

Equipment requirements

- One premium mobile handset on contract
- One standard mobile handset on contract
- One standard set top box
- One premium set top box
- One standard TV set
- One premium TV set
- One standard PC
- One premium PC

Household 2 - Two adults, two children, social grade C2

Household 2 consists of a family of four: two middle-aged parents and two teenage children with a slightly below-average disposable income to spend on communications services. They are technology savvy, but do not require top end equipment or frequent equipment upgrades.

Services and usage profile

- Average call minutes from the home
- One adult on a standard mobile contract with below average call minutes from mobile to national, on-network, off-network and international
- One adult on a standard mobile contract with below average mobile roaming call minutes
- One adult on a standard mobile contract with below average MMS and SMS messaging

- Two children with prepay mobiles with below average call minutes and above average messaging
- Subscribe to standard pay TV package
- Subscribe to standard internet access package
- TV licence

Equipment Requirements

- One standard mobile handset on contract
- Two standard prepay mobile handsets
- One standard set top box
- Two standard TV sets
- One premium TV set
- One free to air DTV decoder
- One standard PC
- One premium PC

Household 3 - One adult, one child, social grade D

Household 3 is a typical single parent working class family with a young child. The family has significantly below average disposable income to spend on communications services. The parent is technology savvy at a base level but cannot afford premium subscription packages or frequent equipment upgrades.

Services and usage profile

- Below average call minutes from the home;
- One adult with a standard prepay mobile with below average call minutes from mobile to national, on-network, off-network and international
- One adult with a standard prepay mobile with no mobile roaming call minutes
- One adult with a standard prepay mobile with below average SMS and no MMS messaging
- Subscribe to dial-up internet access
- TV licence

Equipment requirements

- One standard prepay mobile handset
- Two standard TVs

- One free to air DTV decoder
- One standard PC

Household 4 - Two adults (retired), no children, social grade E

Household 4 is a retired couple supported by the state with no children. The couple has significantly below average disposable income to spend on communications services. The adults are not technology savvy and do not subscribe to a pay TV package.

Services and usage profile

- Significantly below average call minutes from the home
- TV licence

Equipment requirements

- One standard TV set
- One free to air DTV decoder

Figure 5.31 below shows the usage profiles of the above services and equipment/connection fees for the four household types that we have provisionally selected.

Figure 6.4: Price benchmarking household basket compositions

Per calendar month	Household 1 - Two Adults, No Children, Social Grade B	Household 2 - Two Adults, Two Children, Social Grade C2	Household 3 - One Adult, One Child, Social Grade D	Household 4 - Two Adults (retired), No Children, Social Grade E
Voice calls in home to national (minutes) ^a	80	125	50	40
Voice calls in home to local (minutes)	185	305	125	90
Voice calls in home to international (minutes)	10	20	10	5
Voice calls in home to mobile (minutes)	30	50	20	15
Premium Contract Handset	1	0	0	0
Line Rental Contract - Premium Mobile	1	0	0	0
Voice Calls from Premium Mobile to national/mobile (minutes) ^b	360	0	0	0
Voice Calls to Premium Mobile from national/mobile (minutes) ^b	150	0	0	0
Voice calls from Premium Mobile to international (minutes)	10	0	0	0
Inbound/outbound roaming calls to/from premium mobile to/from neighbouring country (minutes)	10	0	0	0
SMS Messages - Premium Mobile ^c	100	0	0	0
MMS Messages - Premium Mobile	5	0	0	0
Standard Contract Handset	1	1	0	0
Line Rental Contract - Standard Mobile	1	1	0	0
Voice Calls from Standard Mobile to national/mobile (minutes) ^b	180	180	0	0
Voice Calls to Standard Mobile from national/mobile (minutes) ^b	70	70	0	0
Voice calls from Standard Mobile to international (minutes)	5	5	0	0
Inbound/outbound roaming calls to/from standard mobile to/from neighbouring country (minutes)	5	5	0	0
SMS Messages - Standard Mobile ^c	50	50	0	0
MMS Messages - Standard Mobile	0	0	0	0
Standard Prepay Handset 1	0	1	1	0
Voice Calls from Prepay Mobile 1 (minutes) ^b	0	40	65	0
Voice Calls to Prepay Mobile 1 (minutes) ^b	0	15	0	0
SMS Messages - Prepay Mobile 1 ^c	0	100	80	0
MMS Messages - Prepay Mobile 1	0	2	0	0
Standard Prepay Handset 2	0	1	0	0
Voice Calls from Prepay Mobile 2 (minutes) ^b	0	20	0	0
Voice Calls to Prepay Mobile 2 (minutes) ^b	0	10	0	0
SMS Messages - Prepay Mobile 2 ^c	0	50	0	0
MMS Messages - Prepay Mobile 2	0	0	0	0
Standard TV set	1	2	2	1
Premium TV set	1	1	0	0
Free to air DTV decoder	0	1	1	1
Basic Set Top Box	1	1	0	0
Premium Set Top Box	1	0	0	0
Pay TV (Standard Package)	0	1	0	0
Pay TV (Premium Package)	1	0	0	0
TV Licence	1	1	1	1
No of basic PCs	1	1	1	0
No of premium PCs	1	1	0	0
Dial-Up Internet (minutes)	0	0	150	0
Broadband (Standard)	0	1	0	0
Broadband (Premium)	1	0	0	0

Source: Ofcom

As part of our basket compositions, we have included connection fees and equipment costs. We believe that these costs should be included alongside ongoing monthly service costs in any benchmarking analysis, since they form a significant part of the ‘real cost of ownership’ of communications services. Equipment costs are particularly significant in the mobile market: some countries’ operators tend to partially or wholly subsidise retail handset prices in order to attract customers; this subsidy then tends to be recouped through higher service charges through the life of a mobile contract. By contrast, other countries’ mobile operators sell handsets at or near cost, and therefore have no need to recoup through service pricing. Therefore, it can be misleading merely to compare mobile service prices – a more accurate and relevant approach is to include the price of the handset, amortised over the length of the contract.

The other significant equipment issues involve PCs and television sets. We believe that any analysis of internet connectivity should include some allowance for PC costs, since they are an essential tool for accessing the internet. Our initial approach to PC costs has been to allocate 30% of the retail price to internet usage (we have allowed for the fact the PCs are also used for non-internet applications such as word processing, gaming, data storage etc.). This proportion of the price is then amortised over a number of years to reflect the average length of ownership. The same approach is taken with TVs, although in this case the full retail price is amortised.

Figure 5.32 shows the calculations used for the monthly cost of ownership. Essentially, all mobile-related connection fees and equipment prices have been amortised over two years (the average length of contract/handset ownership), other connection/installation fees have been amortised over three years, and other equipment prices have been amortised over five years.

Figure 6.5: Price benchmarking equipment/connection

<i>£ per calendar month unless otherwise stated</i>	<i>Notes</i>
Premium Contract Handset	<i>Top of the range handset, amortised over two years, pro rated monthly</i>
Standard Contract Handset	<i>Standard handset, amortised over two years, pro rated monthly</i>
Standard Prepay Handset	<i>Standard handset cost amortised over two years, pro rated monthly</i>
Basic Set Top Box	<i>Basic set top box amortised over three years, pro rated monthly</i>
Premium Set Top Box	<i>Premium set top box amortised over three years, pro rated monthly</i>
PC modem	<i>Assumes standard modem, amortised over three years, pro rated monthly</i>
Basic PC	<i>Assumes basic PC cost 30% allocated to internet usage (rather than offline functionality like word processing etc), amortised over 5 years, pro rated monthly</i>
Premium PC	<i>Assumes premium PC cost 30% allocated to internet usage (rather than offline functionality like word processing etc), amortised over five years, pro rated monthly</i>
Standard TV set	<i>Assumes standard TV set cost amortised over five years, pro rated monthly</i>
Premium TV set	<i>Assumes premium TV set cost amortised over five years, pro rated monthly</i>
Free to air DTV decoder	<i>Assumes DTV decoder cost amortised over 2 years, pro rated monthly</i>

Source: Ofcom

A.3 Underlying tariffs for each country, and results output

We collected a variety of tariffs for each of the countries in the analysis, correct as of October 2006. For each of these countries, we gathered tariff information across all communications services – including bundled tariffs where they were available and appropriate. We generally collected tariffs for two or three major operators in each communications sector (or cross-sector where bundles were involved). In this way, we intended to capture robust tariffs that were available and being used by significant proportions of the population in each country. For this exercise, we chose not to do an exhaustive search of all possible tariffs, both for the reason outlined above, but also because we felt that the tariffs offered by the main operators (particularly those offered by the larger alternative operators) would reflect price competition lower down the market share scale. We therefore feel that our results are broadly reflective of the state of prices in each market. Regarding calls to international destinations, we calculated a blended average price within each tariff for voice calls to the three nearest international destinations relevant to each country (e.g. for the UK, we used France, Netherlands and Belgium as our international call destinations).

The tariffs collected for each country are available for analysis: please contact john.lewis@ofcom.org.uk if you would like to view these underlying data.

A.4 Next steps/issues

This new benchmarking methodology and output is intended to be a 'beta' version that is subject to evolution and improvement. We would like to work closely with other regulators, international bodies, industry and user groups to discuss, debate, refine and update both the methodology and the output. Our progress to date has thrown up a number of important issues and questions, including the following:

- Which countries should we include? We deliberately limited the countries under analysis for this initial report, but would ultimately like to include at least all the OECD nations in the work.
- Are our household types reflective of all the countries under analysis? This is particularly relevant as the number of countries under analysis expands further.

- Are our basket compositions for each household type accurate and reflective of the usage patterns of communications services across our universe of countries?
- Should we include other communications services/products? Examples might include radio (both radio sets and services), gaming, cinema, newspapers.
- Have we treated the amortisation of connection fees and equipment costs in an appropriate way, in terms of proportionate allocation (in the case of PCs) and in terms of the amortisation periods?
- How do we account for special offers or introductory offers? Currently, we have ignored these short-term offers (e.g. first three months at a reduced/free rate) and have only included the post-offer price; however, we may choose to account for these offers by spreading them over a contract period.
- Do we include discounted rates for elderly/low-income consumers where applicable and appropriate? These subsidies might for instance be applied to the Household 4 basket.
- What is our threshold for inclusion of tariffs in terms of their national availability in any given country? For example, in the UK, only around 47% of homes can receive cable, and we have included cable tariffs in our UK analysis. Should any tariff for inclusion be available to all homes in a given country, or to over 50% or to over 20% etc...?
- Have we included a suitably exhaustive set of tariffs for each country in the analysis? We believe that we may have missed a few tariffs that might alter the results marginally, and would want to dedicate more time and resource to ensuring that all tariffs and bundles are captured. However, we are confident that those tariffs that we have listed are both accurate and representative.
- Should we PPP-adjust the results for comparison purposes? As the number of countries expands, we would propose to include both nominal and PPP-adjusted results.
- We have included all sales taxes and other taxes – is this the optimum approach? Many countries have differing personal taxation policies that alter the balance between income tax, sales tax and other personal taxes – should we be making any adjustments to reflect these differences?

We look forward to working with all interested parties to take this project forward to a point where we can produce regular, accurate international price benchmarking for communications services and products.

Appendix B: International online survey methodology

This research was conducted in October 2006 by Synovate for Ofcom. The survey was conducted using CAWI (Computer Assisted Web Interviewing) across seven countries: the UK, France, Germany, the US, Italy, Japan and China. Sample sizes were around 400 adults in each country, designed to reflect national profiles of gender and age, using quota sampling. Adults interviewed were aged 18-65, except in Japan and China where respondents were 18-55.

All respondents were broadband users at home and therefore this data is not representative of each country's population, and does not provide data on market penetration. Rather, it provides an illustration of comparative levels of usage across markets among broadband users. Given that the samples are all broadband users at home, countries with low broadband penetration will present inflated usage figures overall, as these adults are likely to be high end users and early adopters – for example, China.

The table below shows sample size and spread for each country.

Country	Base Respondents	Gender %		Age %		
		Male	Female	18-24	25-44	45-64
UK	404	48	52	15	43	42
France	389	49	51	15	43	42
Germany	403	50	50	13	46	41
US	405	47	53	16	46	38
Italy	385	52	48	13	51	37
Japan	398	47	53	18	52	30
China	397	50	50	15	61	24

Note: For Japan and China adults interviewed were aged 18-55

Appendix C: Basic data used in the report

C.1 GDP figures

Source: IMF

Basis: Annual GDP figures

C.2 Financial years

Calendar year for all countries except Japan

C.3 Exchange rates

Source: IMF

Basis: Average during 2005

Country	Local currency	Local/GBP
UK	GBP	1.0
Euro area	EUR	1.5
USA	USD	1.8
Japan	JPY	200.4
China	CNY	14.9
Sweden	SEK	13.6
Poland	PLN	6.7

C.4 Population figures

Source: US Census bureau

Basis: Mid-year figures

C.5 Households

Source: IMF

Basis: Mid-year figures

Note: for households, Multiple Dwelling Units (MDUs) are not explicitly considered. One subscriber or one telco line equates to one person or household, or one SIM card to one person in case of mobiles.

Glossary of terms and definitions

2G Second generation of mobile telephony systems using digital encoding. 2G networks support voice, low speed data communications, and short messaging services.

2.5G In mobile telephony, 2.5G protocols extend 2G systems to provide additional features such as packet-switched connections (GPRS) and enhanced data rate.

3G Third generation of mobile systems. Provide high-speed data transmission and supporting multimedia applications such as full-motion video, video-conferencing and Internet access.

Access network Electronic Communications Network which connects end-users to a service provider; running from the end-user's premise to a Local Access Node and supporting the provision of access based services. It is sometimes referred to as the local loop or last mile.

ADSL Asymmetric Digital Subscriber Line. A digital technology that allows the use of a copper line to send high bandwidths in downlink direction and a lesser bandwidth in the uplink.

AM Amplitude Modulation. Type of modulation produced by varying the strength of a radio signal. This type of modulation is used by broadcasters in three frequency bands: medium frequency (MF, also known as medium wave: MW); low frequency (LF, also known as long wave: LW), and high frequency (HF, also known as short wave: SW). The term AM is often used to refer to the medium frequency band (see MF below).

ATT Analogue Terrestrial Television. The television broadcast standard that all television industries launched with. Most countries in this study are planning to phase out ATT in the next ten years.

Bit-rates The rate at which digital information is carried within a specified communication channel.

Bitstream A service providing transmission capacity between an end-user's premise and the point of interconnection made available by the incumbent to a competitive provider of electronic communications services.

Bluetooth Wireless standard for short-range radio communications between a variety of devices such as PCs, headsets, printers, mobile phones, and PDAs.

Broadband A service or connection generally defined as being "always on" and providing a bandwidth greater than 128kbit/s.

BSC Broadcasting Standards Commission, whose functions transferred to Ofcom on 29th December 2003.

CAGR Compound Annual Growth Rate. The average annual growth rate over a specified period of time. It is used to indicate the investment yield at the end of a specified period of time. The mathematical formula used to calculate CAGR = $(\text{present value}/\text{base value})^{(1/\#\text{of years})} - 1$

Called Party Pays A system of charging for telecommunications services whereby the party that receives the call (the 'called party') pays for both the origination and termination of the call.

CDMA Code Division Multiple Access. The basis for the primary 2G technology; and the later evolution of mobile technology in the US and related markets. A technology that allows a band of spectrum to be shared by multiple concurrent users. Rather than subdividing the spectrum (FDMA) or determining usage on a round robin basis (TDMA), unique codes are used to differentiate subscribers so they can simultaneously use the same spectrum.

Coders The devices which convert a signal from one form into another, digital form. The input may be an analogue signal or it may be a digital signal coded in a form other than that desired for the particular purpose of communication required. In digital radio, the term generally refers to the devices which produce a digital sound programme service in a form suitable for acceptance by a multiplexer. The multiplexer combines it with the other services for transmission as a single, combined complex signal (see also Multiplex). A particular feature of digital radio coders is that they seek to avoid sending information that is not needed to recreate the sound in the receiver, thereby requiring less capacity (bit-rate) in the multiplex transmission. However, the more information is taken away from the signal, the greater the probability of imperfect reproduction of sound by the receiver.

Co-regulation The sharing of regulation between a statutory body (e.g. Ofcom) and its licensees.

Core network Backbone network connecting the major nodes in the network, and linked to the access network (last mile) via the backhaul links (middle mile).

CPS Carrier Pre-selection. The facility offered to customers which allows them to opt for certain defined classes of call to be carried by an operator that has been selected in advance and has a contract with the customer. CPS does not require the customer to dial a routing prefix or use a dialler box.

DAB Digital Audio Broadcasting. A set of internationally accepted standards for the technology by which terrestrial Digital Radio multiplex services are broadcast in the UK.

Data packet In networking, the smallest unit of information transmitted as a discrete entity from one node on the network to another.

Digital switchover The process of switching over the current analogue television broadcasting system to digital, as well as ensuring that people have adapted or upgraded their televisions and recording equipment to receive digital TV.

DMB Digital Mobile Broadcasting. A variant of the DAB digital radio standard for mobile TV services, and an alternative to DVB-H (see DVB, below).

Downlink speed. Also downlink or download. Rate of data transmission from a network operator's access node to a customer, typically measured in Megabits per second.

DSL Digital Subscriber Line. A family of technologies generally referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as 'twisted copper pairs') into high-speed digital lines, and of supporting advanced services such as fast Internet access and video-on-demand. ADSL, HDSL (High data rate Digital Subscriber Line) and VDSL (Very high data rate Digital Subscriber Line) are all variants of xDSL).

DTT Digital Terrestrial Television, currently most commonly delivered through the Freeview service.

DVB Digital Video Broadcasting. A set of internationally accepted open standards for digital broadcasting, including standards for distribution by satellite, cable, radio and handheld devices (the latter known as DVB-H).

DVD Digital Versatile Disc. A high capacity CD-size disc for carrying audio-visual content. Initially available read-only, but recordable formats are now available.

EBITDA Earnings Before Interest, Tax, Depreciation and Amortisation.

EPG Electronic Programme Guide. A programme schedule, typically broadcast alongside digital television or radio services, to provide information on the content and scheduling of current and future programmes.

EBU European Broadcasting Union. A professional association of public service broadcasters, representing their interests to the European institutions. It negotiates broadcasting rights for major sports events, operates the Eurovision and Euroradio networks, organises programme exchanges and coordinates co-productions.

Ex ante regulation Regulation to address behaviour before it happens.

Fairness Doctrine FCC regulation that applied to broadcasters in the US between 1949 and 1987 aimed at promoting controversial speech in news and informational programming and to ensure impartiality.

Fibre-to-the-cabinet Access network consisting of optical fibre extending from the access node to the street cabinet. The street cabinet is usually located only a few hundred metres from the subscriber premises. The remaining segment of the access network from the cabinet to the customer is usually a copper pair but could use another technology, such as wireless.

FM Frequency Modulation. Type of modulation produced by varying the frequency of a radio carrier in response to the signal to be transmitted. This is the type of modulation used by broadcasters in part of the VHF (Very High Frequency) band, known as VHF Band 2.

Format The type of programme service broadcast by radio stations. Also, the part of a radio station's licence which describes the programme service.

FTA Free-to-air. Broadcast content that people can watch or listen to without having to pay a subscription.

GDP Gross Domestic Product.

GPRS General Packet Radio Service. A packet data service provided over 2.5G mobile networks.

GSM Global Standard for Mobile Telephony. The most commonly used 2G mobile standard worldwide.

HD Radio Hybrid Digital Radio. A radio standard developed in the US for terrestrial broadcasters, offering high-quality audio.

HDTV High Definition Television. A technology that provides viewers with better quality, high-resolution pictures.

HSDPA High Speed Downlink Packet Access. An evolution of 3G mobile technology, often called 3.5G, which offers higher downlink speed.

Interconnection The linking of one Public Electronic Communications Network to another for the purpose of enabling the persons using one of them to be able (a) to communicate with users of the other one; (b) to make use of services provided by means of the other one (whether by the provider of that network or by another person).

International roaming A service offered by mobile operators that allows customers to use their phone abroad. The home operator has agreements with foreign operators that allows customers to make and receive calls, send and pick up text messages, and use some of the other mobile services (such as access to voicemail or topping-up credit on pre-pay phones). The exact services available and the charges for their use vary between operators.

Internet A global network of networks, using a common set of standards (e.g. the Internet Protocol), accessed by users, typically with a computer via a service provider.

IP Internet Protocol. The packet data protocol used for the routing and carriage of messages across the Internet and similar networks.

IPTV Internet Protocol Television. The term used for television and/or video signals that are delivered to subscribers or viewers using Internet Protocol (IP), the technology that is also used to access the Internet. Typically used in the context of streamed linear and on demand content, but also sometimes for downloaded video clips.

ISDN Integrated Services Digital Networks. A standard developed to cover a range of voice, data, and image services intended to provide end-to-end, simultaneous handling of voice and data on a single link.

ISP Internet Service Provider. A company that provides access to the Internet.

L-Band A range of frequencies within which an allocation has been made in much of the world for broadcasting (1452 to 1492 MHz), generally by satellite, but in Europe for terrestrial digital sound broadcasting in the range 1452 to 1480 MHz. Some DAB digital radio receivers can tune to this range.

LAN Local area network. A network allowing the interconnection and intercommunication of a group of computers on a single site, primarily for the sharing of resources and exchange of information (e.g. email).

Leased Line A transmission facility which is leased by an end user from a public carrier, and which is dedicated to that user's traffic.

LLU Local Loop Unbundling. A process by which an incumbent operator's exchange lines are physically disconnected from their network and connected to a competing operator's networks. This enables operators other than the incumbent to use the local loop to provide services to customers.

Local Loop The access network connection between the customer's premises and the local PSTN exchange, usually a loop comprised of two copper wires.

MCA Measured Coverage Area. The area in which signal levels meet or exceed Ofcom's stated criteria for defining coverage.

MF Medium Frequency. The part of the spectrum between 300 kHz and 3000 kHz. The broadcast part of this band (531 kHz to 1602 kHz) is often known as the medium wave (MW) or AM band (see AM above).

MMS Multimedia Messaging Service. The next generation of mobile messaging services, adding photos, pictures and audio to text messages.

MPEG Moving Picture Experts Group. A set of international standards for compression and transmission of digital audio-visual content. Most digital television services in the UK use MPEG2, but MPEG4 offers greater efficiency and is likely to be used for new services including TV over DSL and High Definition TV.

Multichannel In the UK, this refers to the provision or receipt of television services other than the main five channels (BBC ONE & TWO, ITV1, Channel 4/S4C, Five) plus local analogue services. 'Multichannel homes' comprise all those with digital terrestrial TV, satellite TV, digital cable or analogue cable, or TV over broadband. Also used as a noun to refer to a channel only available on digital platforms (or analogue cable).

Multiplex A device that sends multiple signals or streams of information on a carrier at the same time in the form of a single, complex signal. The separate signals are then recovered at the receiving end.

MVNO An organisation which provides mobile telephony services to its customers, but does not have allocation of spectrum or its own wireless network.

MW See MF and AM above.

Narrowband A service or connection providing data speeds up to 128kbps, such as via an analogue telephone line, or via ISD.

NGN Next Generation Network. A new type of network being considered or built by many telecoms operators to replace their existing infrastructure. Typically, they are packet-based, able to make use of many transport technologies and have service-related functions independent from underlying transport-related technologies. It is expected that the many separate networks run by most operators will be replaced by a single NGN.

OECD Organisation for Economic Cooperation and Development.

PAYG Pay-as-you-go.

Pay-per-view A service offering single viewings of a specific film, programme or event, provided to consumers for a one-off fee.

PDA Personal Digital Assistant .

Peaktime The period during which:

- a radio station broadcasts its breakfast show and, on weekdays only, also its afternoon drive-time show;
- a television station broadcasts its early- and mid-evening schedule, typically used by Ofcom to refer to the period between 18:00 and 22:30 each day (including weekends).

Podcasting A way for digital audio files to be published on the Internet, which can then be downloaded onto computers and be transferred to portable digital audio players.

PPC Partial Private Circuit.

PSB Public Service Broadcasting, or Public Service Broadcaster. The Communications Act in the UK defines the PSBs to include the BBC, ITV1, Channel 4, Five and S4C.

PSTN Public Switched Telephony Network.

PVT Public Value Test. One of the two components that together form the Public Value Assessment (PVA) for any new BBC service. The second component is the Market Impact Assessment (MIA) undertaken by Ofcom.

PVR Personal Video Recorder (also known as Digital Video Recorder).

RAB Radio Advertising Bureau.

Regulatory holiday A commitment by a regulator not to impose regulatory measures on a given product or service for a specified period of time.

RSL Restricted Service Licence. A radio licence serving a single site (e.g. a hospital or university campus) or serving a wider area on a temporary basis (e.g. for festivals and events).

Scrolling text facilities The feature of digital radios which enables broadcaster-compiled text to be displayed. Limitations on physical space on the display leads to the messages being scrolled across the display so that they can be read.

SDSL Symmetric Digital Subscriber Line. Unlike ADSL, it offers the same fast data rate speeds in both directions.

Service provider A provider of electronic communications services to third parties whether over its own network or otherwise.

Share (Radio) Amount of listening hours to a particular radio station as a percentage of all radio listening within that station's Total Survey Area.

Share (TV) Proportion of total TV viewing to a particular channel over a specified time period.

Shock-Jock A style of talk radio presentation pioneered in the US, where the host expresses controversial views and opinions.

Simulcasting The broadcasting of a television or radio programme service on more than one transmission technology (e.g. FM and MW, DAB and FM, analogue and digital terrestrial television, digital terrestrial and satellite).

SME Small or Medium sized Enterprise.

SMS Short Messaging Service.

Sub-loop unbundling A variant of LLU where a competitive operator takes control of only a portion of a customer's local loop, allowing them to install their equipment closer to the

customer and potentially offer higher speed services. In Sub-loop unbundling, the point of handover is commonly the Primary Connection Point (PCP) or street cabinet.

Telecommunications, or 'Telecoms' Conveyance over distance of speech, music and other sounds, visual images or signals by electric, magnetic or electro-magnetic means.

Timeshifting The broadcasting of a television service on more than one channel with a specified delay (typically an hour), to provide more than one opportunity for viewers to watch the service. Alternatively, the recording of programmes by viewers (using PVRs, recordable DVDs or VCRs) to watch at another time.

Transmitter A device which amplifies an electrical signal at a frequency to be converted, by means of an aerial, into an electromagnetic wave (or radio wave). The term is commonly used to include other, attached devices, which impose a more simple signal onto the frequency, which is then sent as a radio wave. The term is sometimes also used to include the cable and aerial system referred to above, and indeed the whole electrical, electronic and physical system at the site of the transmitter.

TSA Total Survey Area. The coverage area within which a radio station's audience is measured by RAJAR.

TV over DSL/TV over Broadband A subset of IPTV. A technology that allows viewers to access TV content – either in a linear programme schedule, or on-demand – using Internet Protocol via broadband services, either on a PC or (via a set-top box) on a TV set.

TVWF Television Without Frontiers. A range of provisions designed to achieve coordination of the legal, regulatory and administrative frameworks of European Union member states with respect to television broadcasting, adopted by the European Council in 1989 and amended in 1997.

UMTS Universal Mobile Telecommunications System. The 3G mobile technologies most commonly used in the UK and Europe.

VHF Very High Frequency. The part of the spectrum between 30 MHz and 300 MHz. FM radio is broadcast on part of this band (87.6 MHz to 107.9 MHz) and DAB digital radio is broadcast on another (Band III: 217.5 MHz to 230 MHz in the UK, and over a wider range, but shared with TV services, elsewhere in Europe).

VCR Video Cassette Recorder.

VDSL Very high bit rate DSL. This is currently the fastest version of DSL and can transmit very high data rates on short reaches of the local loop.

VoB Voice over Broadband. A technology that allows calls to be sent over the Internet, using broadband services.

VoD Video on Demand. A service or technology that enables TV viewers to watch programmes or films whenever they choose, not restricted by a linear schedule. Near Video on Demand (NVoD) is a service based on a linear schedule that is regularly repeated on multiple channels, usually at 15-minute intervals, so that viewers are never more than 15 minutes away from the start of the next transmission.

VoIP Voice over Internet Protocol. A technology that allows calls to be sent over the Internet, using either the public Internet or private IP networks.

WAN Wide area network. A network allowing the interconnection and intercommunication of a group of computers over a long distance.

WAP Wireless Application Protocol.

Wireless LAN or **WiFi** (Wireless Fidelity) Short range wireless technologies using any type of 802.11 standard such as 802.11b or 802.11a. These technologies allow an over-the-air connection between a wireless client and a base station, or between two wireless clients.

WiMAX A wireless MAN (metropolitan area network) technology, based on the 802.16 standard. Available for both fixed and mobile applications.

WLR Wholesale Line Rental. A regulatory instrument requiring the operator of local access lines to make this service available to competing providers at a wholesale price.

The definitions in this glossary are for general guidance purposes only and do not represent legal definitions.

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