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The changing economic impact of the telecommunications sector in the EU

A report for Telefónica

December 2008

This report was commissioned by Telefónica as part of its commitment to enable a wider understanding of the contribution of the telecommunications sector to the European economy.

This report has been produced by cebr, an independent economics and business research consultancy established in 1993 providing forecasts and advice to City institutions, government departments, local authorities and numerous blue chip companies throughout Europe. The contributors to this report are Douglas McWilliams and Richard Snook.

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Brussels, December 2008

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Executive summary

Key points emerging from this study are:

- Telecommunications are making an increasingly large contribution to the European Union's economy. This has risen from 2.7 per cent in 2000 to 3.4 per cent in 2007. We expect growth in the telecommunications sector to continue to outpace that of the economy as a whole and for its economic contribution to reach 3.7 per cent in 2013.
- In value terms the economic contribution of telecommunications has risen from €218 billion in 2000 to €374 billion in 2007 and we forecast will rise to €512 billion by 2013. The sector contributes more to the EU economy than the IT industry or the hospitality sector
- In 2007 the EU telecommunications sector supported 3.56 million jobs. We forecast that this will rise to 3.71 million in 2013.
- The telecommunications sector is one of the most productive in the European Union. Each worker in the sector contributes €105,000 to the economy each year. This is more than twice the EU average of €50,000.
- We forecast that the productivity gap between telecommunications and the EU average will continue to expand. In 2013 economic output per worker in telecommunications is set to rise to €138,000, compared to the EU wide average of €61,000.
- The importance of the telecommunications industry to each individual member state varies significantly across the EU. Telecommunications is most important to the economies of Bulgaria, Luxemburg, Latvia, Cyprus and Hungary.
- The industry makes a major contribution to public finances, providing €187 billion in tax revenues in 2007. We forecast that this will rise to €223 billion by 2013.

1 Introduction

This study was commissioned by Telefónica and prepared by the centre for economics and business research (cebr) to assess the economic contribution of the telecommunications sector to the European Union economy (EU-27), and how this is likely to change over the next five years.

We initially estimate the current size and composition of the telecommunications sector, split between the following components and sub-components:

1. The impact of **operators** of telecommunications services which we sub-divide into;
 - a. Mobile
 - b. Fixed line
 - c. Broadband
 - d. Other (includes the transmission of radio and television programmes and satellite communications)
2. The **upstream** impact on firms who supply goods and services to telecommunications operators
3. The **downstream** impact on distributors of telecommunications equipment and services in the retail and wholesale sectors

The focus of this report is the direct impact of the telecommunications sector on employment and economic output in the EU. There is also a large body of research that discusses the wider benefits of telecommunications¹. Wider benefits beyond those directly associated with activity in the sector are thought to accrue because telecommunications technology boosts productivity in other sectors and enables economic activity to occur to a greater extent than would have been possible in the absence of telecommunications. In order to account for these wider benefits we apply a multiplier effect to the final calculation of economic impact.

This study builds upon previous work by cebr on the United Kingdom telecommunications sector for O2 which include: *'The contribution of mobile phones to the UK economy'*² and *'The changing economic impact of mobile phones'*³.

¹ See for example: Timmer, M.P. Van Ark, B. 'Does information and communication technology drive EU-US productivity growth differentials?'. Oxford Economic Papers, 2005 Oxford Univ Press

² Available online: http://www.o2.com/media_files/news_100504.pdf

³ Available online: http://www.o2.com/media_files/changing_impact_cebr_report_210704.pdf

2 Methodology and approach

For the purpose of this study we define the telecommunications sector following the European Classification of Economic Activities (NACE)⁴. Within this classification the telecommunications sector is NACE 64.2 (rev 1.1). This includes wired telecommunications activities, wireless telecommunications activities, satellite telecommunications activities, the transmission of radio and television programmes and other telecommunications activities (but excludes the production of television and radio programmes).

This definition is narrower than that employed in some previous work which tends to group the telecommunications and information and computer technology sectors together. An example of this type of work has been published by the European Commission Information Society⁵.

Data on the overall economic impact of the telecommunications sector is available from the EU statistical information office, Eurostat. We measure this economic contribution in terms of value added. This is calculated by subtracting the consumption of a sector from the rest of the economy (i.e. its supply chain costs) from the sectors turnover. The resulting figure is a measure of what the processes within the sector add to the economy.

In order to separate the economic output of the telecommunications operators into mobile, fixed line, broadband and other we have drawn upon a number of data sources. We have extracted data from the annual reports of all major EU telecommunication companies to ascertain the turnover, profitability, labour costs and employment in the sector and, when provided, how this is split between mobile, fixed line and broadband operations. In addition we have utilised data from Eurostat on the breakdown of turnover within the telecommunications sector. The final source of information used in this segment of the analysis is taken from analyst reports on the various sectors. We have compiled information using reports published by Ovum, GSMA, ING, Informa and Analysys Mason.

Estimates of the upstream and downstream impact on the telecommunications supply chain and retail and wholesale sectors are based on analysis of input-output tables for the European Union. The calculation of tax receipts is based on simulations in our in-house structural model of the European Union economy.

The forecasting element of the analysis is again founded on our in-house structural model of the EU economy which contains forecasts for the telecommunications sector. We also used analyst forecasts to corroborate our forecasts for the EU communications sector and add insights into the differential growth split between mobile, fixed line and broadband.

Finally we apply a multiplier of 1.1 to the economic impact figures to account for the wider benefits of telecommunications in boosting activity in other sectors of the EU economy. This

⁴ For more details on NACE classifications see:

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=3233,73049386&_dad=portal&_schema=PORTAL

⁵ European Commission Information Society DG, ECi 2010, Annual Report 2007

figure is telecom specific and is derived from our macro-economic model of the EU economy. Multiplier effects were a key element of the theoretical framework of Keynes and arise because increasing economic activity in one sector will indirectly support activity in other sectors. An example of this mechanism is employee spending in restaurants or retail outlets, this is known as an 'induced multiplier effect'.

There is some uncertainty over the scale of multiplier effects and the extent to which they vary according to the economic cycle. To put our figure into context, a recent estimate of the multiplier effect for the telecommunications sector in Scotland put the value at 1.2 . Our estimate of the multiplier effect can be considered to be relatively conservative and seeks only to capture the induced effects of employee spend. This is in order to avoid double counting the upstream and downstream impacts of telecommunications which we have modelled explicitly.

3 The European Union telecommunications sector

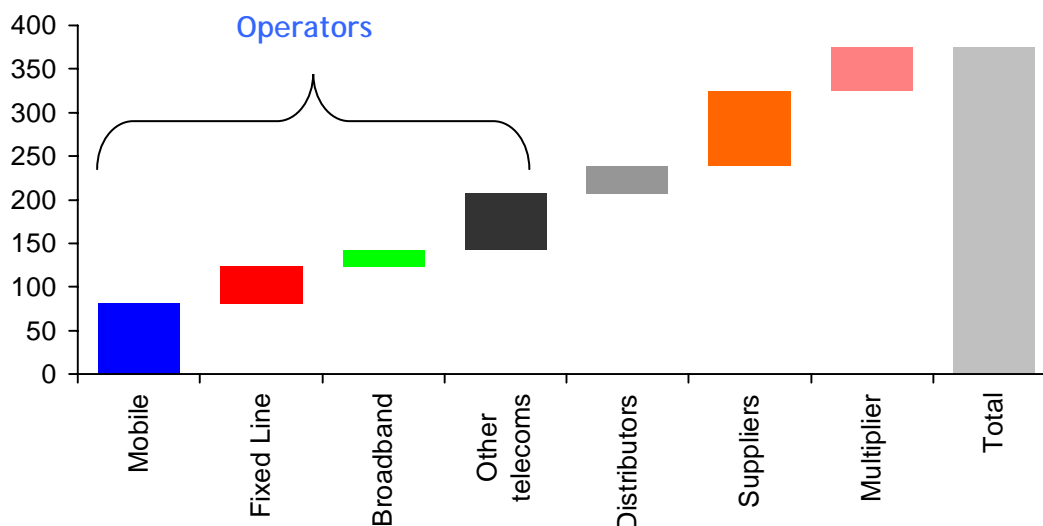
In this chapter we present data which characterises the scale and recent growth of the EU telecommunications sector. The key points in this chapter are as follows:

- The telecommunications sector contributed €374 billion to the European Union economy in 2007, up from €218 billion in 2000.
- The sector has grown rapidly in recent years, in 2000 it accounted for 2.7 per cent of the economy, rising to 3.4 per cent in 2007.
- The telecommunications sector provides jobs for 3.6 million people in the European Union.
- The importance of the sector to different EU member states varies significantly; Telecommunications is most important to the economies of Bulgaria, Luxemburg, Latvia, Cyprus and Hungary.

Economic output

As shown in figure 1, the direct contribution of the EU telecommunications sector to the economy stood at €374 billion in 2007.

Figure 1. Contribution of telecommunications to the EU economy, value added, billions of euro, 2007



Source: Eurostat, cebr

To provide some context to this figure, the EU telecommunications sector is significantly larger than the hotels and restaurant sector (€168 billion), the real estate sector (€248 billion)

and the IT sector (€170 billion). However, it remains smaller than the manufacturing sector (€1.63 trillion) and the wholesale and retail sector (€1.02 trillion)⁶.

As discussed in the introduction we break down the benefit of telecommunications into three categories. The first is the direct economic value created by telecommunications operators. Of these, the largest sub-component is now mobile, which accounted for €80 billion of value added in 2007. Other telecommunications services, which include radio, television and satellite transmission, account for €65 billion of value added and fixed line services €44 billion. The economic output of broadband services has grown rapidly in recent years but was still only €18 billion in 2007.

In addition to direct operator benefits there is further economic contribution from distributors. These are downstream retail and wholesale activities which sell telecommunications services and devices to consumers. These sectors generate significant revenue, although the contribution to the economy in terms of value added only amounted to €32 billion in 2007. The reason for this relatively small contribution is a large subtraction from distributors' revenues to account for double counting; much of the value added by these activities is already included in telecommunication operators revenues. More detailed figures on the calculation of value added are contained in table one.

Further additions to the EU economy come about from upstream supply chain spending by telecommunications operators. This added €86 billion to the EU economy in 2007. Finally, €49 billion is added due to multiplier effects.

⁶ All figures in this paragraph are sourced from Eurostat and refer to 2005, the latest year for which data is available. The figures quoted do not include upstream and downstream impacts

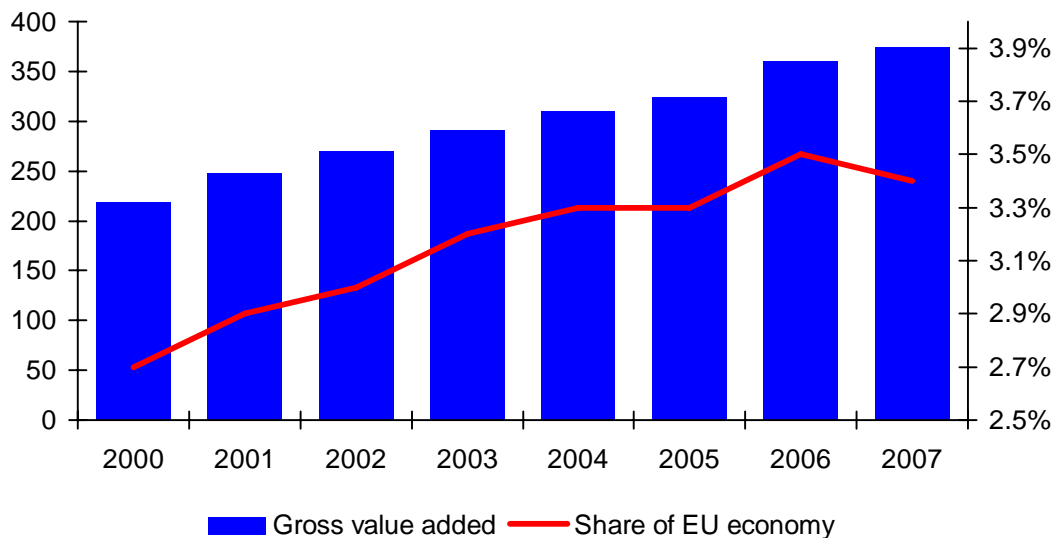
Table 1. The economic impact of the telecommunications sector, 2007

Category	Billions of euro 2007
Turnover of telecommunications operators	€450
Distributors turnover arising from downstream sales of telecommunication goods and services	€132
Suppliers upstream turnover from sales to telecommunications operators	€247
<i>Less adjustment for double counting</i>	
Cost of sales of telecommunications operators	€247
Cost of sales of distributors	€99
Cost of sales of suppliers of telecom operators	€161
Total impact on GDP, excluding multiplier	€325
% of EU-27 GDP	3.0%
Multiplier	€49
Total impact on GDP, including multiplier	€374
% of EU-27 GDP	3.4%

Source: cebr, figures may not sum due to rounding

The telecommunications sector in the EU has grown rapidly in recent years. As shown in figure 2, the value added of the sector has increased from €218 billion in 2000 to €374 billion in 2007.

Figure 2. Value added of EU telecommunications sector, billions of euro, current prices (left axis), share of economy (right axis)



Source: Eurostat, cebr

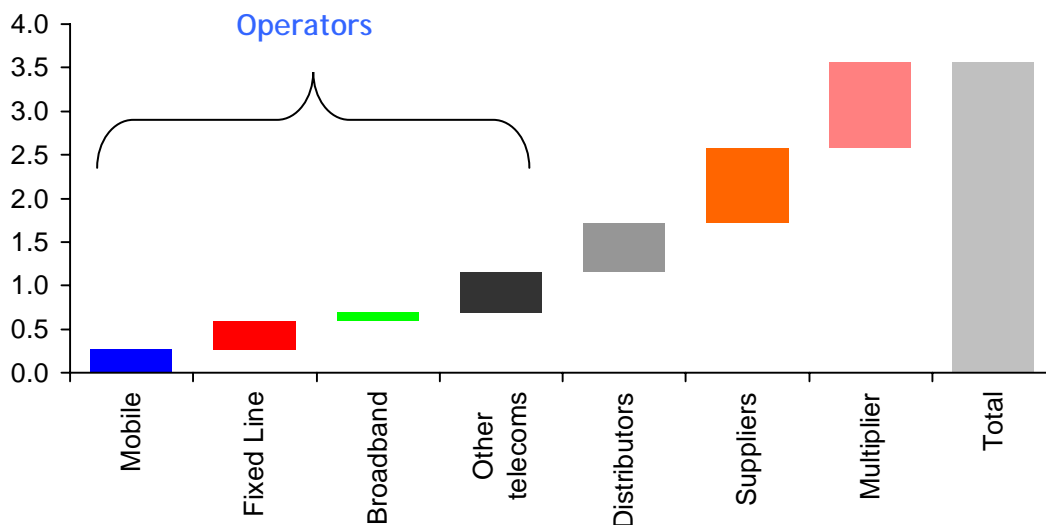
The expansion of the sector between 2000 and 2004 in particular far exceeded growth in the economy as a whole. Telecommunications grew from 2.7 per cent of the EU economy in 2000 to almost 3.3 per cent in 2004. The rapid growth in this period was underpinned by rising penetration and usage of mobile phones and the internet in particular. After 2004, growth in the sector has been closer to that of the economy as a whole and by 2007 the sectors contribution to the economy was 3.4 per cent.

Because the sector has significantly outperformed the EU economy over the 2000 to 2007 period, the telecommunications sector accounted for an average of 6.2 per cent of economic growth per year. This is almost twice its relative size in the economy, which averaged 3.2 per cent.

Employment

The telecommunications sector currently supports 3.56 million jobs in the EU. Of these, 1.16 million work directly for telecommunications services operators. Splitting these direct employees between the four sub-sectors; 260,000 work in mobile, 340,000 in fixed line, 100,000 in broadband and 470,000 in other telecommunications services.

Figure 3. Employment in the EU telecommunications sector, millions, 2007



Source: Eurostat, cebr

In addition to the workers at telecommunications operators; a further 550,000 jobs in distributors are supported by the sector, 860,000 million in suppliers and 980,000 as a consequence of multiplier effects on the wider economy.

Cross country comparisons

The final information that we present in this section concerns how the importance of the telecommunications sector varies across different member states of the EU-27. Figure 4 below presents the proportion of economic output and employment that resulted from telecommunications operators in 2005. This data excludes upstream and downstream activities and multiplier effects that result from telecommunications activities.

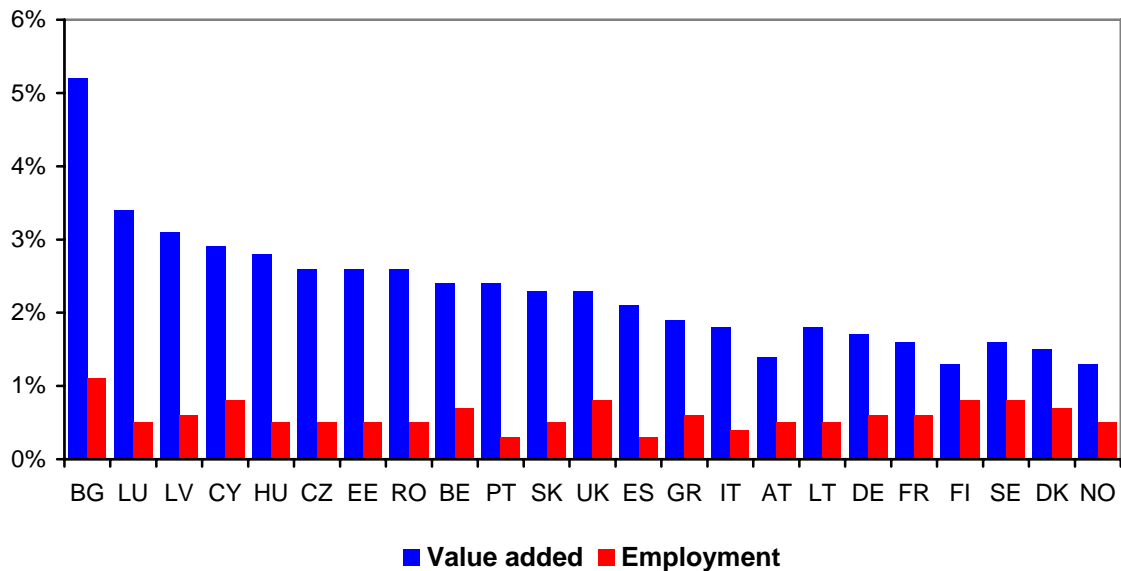
Among the EU-27's members with available data, Bulgaria receives the greatest proportionate economic contribution from the telecommunications sector at 5.2 per cent of total gross value added. The sector is also extremely important in other smaller EU states such as Luxembourg (3.4 per cent), Latvia (3.1 per cent), Cyprus and Hungary (2.9 per cent each). The sector is also extremely important to the Czech Republic, accounting for 2.6 per cent of the economy and 0.5 per cent of employment. Adoption of communications technologies in the Czech Republic has been rapid, for example, internet usage has risen from 10 per cent of the population in 2000 to 50 per cent in 2006.⁷

Turning to the three largest member states of the European Union; telecommunication services contribute €37.2 billion in the UK economy (2.2 per cent), €33.7 billion to the German economy (1.7 per cent) and €25.3 billion to the French economy (1.6 per cent). The telecommunications sectors in each of these nations have shown rapid growth since 2001. In

⁷ International Telecommunication Union

Germany, GVA has grown by 57 per cent over this period, this compares to 38 per cent in France and 20 per cent in the UK.

Figure 4. Share of value added and employment of telecommunications services as a proportion of total (NACE 1.1 64.2), 2005



Source: Eurostat

BG, CZ, LU: 2004 data.

No data available for Ireland, Malta, The Netherlands, Poland and Slovenia

It is also noticeable that in all states, telecommunications accounted for a higher proportion of economic activity than their share of the workforce. This signifies labour productivity that is above the average for the rest of the economy. With the exception of Bulgaria, no member state had greater than 1.0 per cent of its workforce employed directly in telecommunication, yet in all states it contributes in excess of 1.0 per cent to economic output.

4 Prospects for the telecommunications sector

We now focus on the prospects for the telecommunications sector and its sub-sectors over the next five years. We have forecast turnover, gross operating surplus and employment from which we have calculated the economic impact of these sub-sectors in terms of value added and productivity.

The key trends that we expect to see in the telecommunications sector over the next five years are that:

- The communications sector will be more resilient than most sectors to the current downturn in the economy. Growth will exceed that of the economy as a whole over the next five years, with the contribution of telecommunications to the EU economy rising from €374 billion in 2007 to €512 billion by 2013 this equates to 3.7 per cent in of the economy in 2013, from 3.4 per cent in 2007.
- However, the pace of growth will be markedly lower in comparison to recent years. The compound annual growth rate in value added is forecast to be 5.3 per cent from 2008-2013, this compares to 8.0 per cent over the 2001-2007 period.

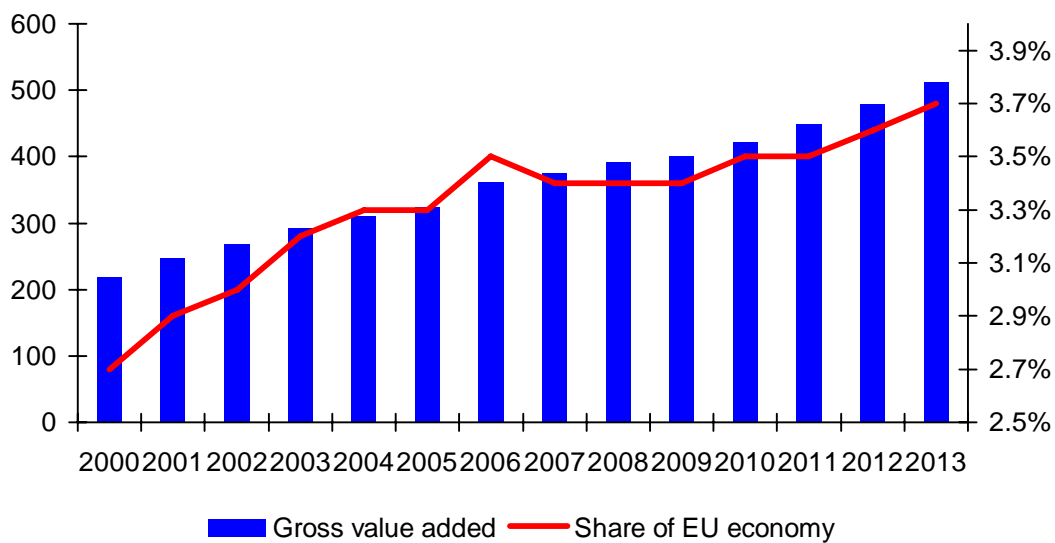
The sector, which is often considered to be acyclical, or even counter-cyclical will slow in response to credit crunch and current economic downturn in the European Union. The sector is closer to maturity than in previous downturns so growth in the total market size will be unable to fully compensate for falling revenue per user and consumers and businesses reigning in discretionary spending.

Economic output

Figure 5 depicts the expected growth of the telecommunications sector in terms of value added and percentage contribution to the EU economy. The value added of the telecommunications sector rose from €218 billion in 2000, to €374 billion in 2007. We expect it to rise further to €512 billion in 2013. This equates to 2.7 per cent of the EU economy in 2000, 3.4 per cent in 2007 and 3.7 per cent in 2013.

The sector will continue to expand in 2008 and 2009, but at a markedly slower pace than in previous periods as it suffers from weak overall economic performance in the European Union. Consumers and businesses are likely to tighten their belts as many face higher debt servicing costs and have faced rising expenses as a result of above target inflation in much of the continent.

Figure 5. Value added of telecommunication sector, billions of euro, current prices (left axis), share of economy (right axis)



Source: cebr

With the telecommunications sector to continue outperforming the economy over the 2007 to 2013 period, it will continue to make a disproportionately high contribution to economic growth. We estimate that the sector will account for 4.5 per cent of growth in the EU-27, despite only making up 3.5 per cent of the economy.

Table 2 summarises the components of the sector’s value added in 2007 and 2013. The largest contribution to the economy will still come from activities of telecommunications operators in mobile, fixed line, broadband and other telecommunications services.

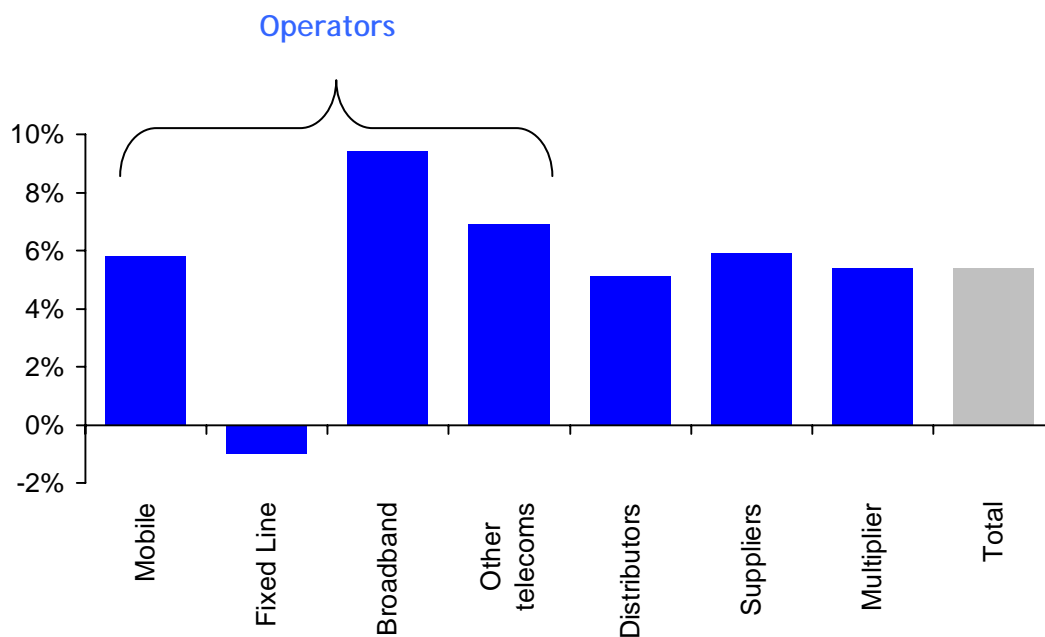
Table 2. The economic impact of the telecommunications sector

Category	Billions of euro 2007	Billions of euro 2013
Turnover of telecommunications operators	€450	€565
Distributors turnover arising from downstream sales of telecommunication goods and services	€132	€178
Suppliers upstream turnover from sales to telecommunications operators	€247	€283
<i>Less adjustment for double counting</i>		
Cost of sales of telecommunications operators	€247	€283
Cost of sales of distributors	€99	€134
Cost of sales of suppliers of telecom operators	€161	€162
Total impact on GDP, excluding multiplier	€325	€446
% of EU-27 GDP	3.0%	3.2%
Multiplier	€49	€67
Total impact on GDP, including multiplier	€374	€512
% of EU-27 GDP	3.4%	3.7%

Source: cebr, figures may not sum due to rounding

Figure 6 provides information on which sub-sectors of the telecommunications sector are likely to perform the strongest over the next five years. We expect that economic growth in mobile operators will progress at an average of 5.8 per cent per year. Despite high saturation of mobile ownership in Europe and falling levels of average revenue per user in traditional voice services, there is still considerable room for expansion in the sector. We expect the continued substitution from fixed line to mobile to support the usage of voice services. In addition, improvements in handset technology and the increased penetration laptop computers and handsets with next generation technologies will increase the market for mobile broadband, infotainment and M-advertising.

Figure 6. Compound annual growth in telecommunications value added, by sub-sector, 2007-2013



Source: Eurostat, cebr

Mobile revenues have resisted previous economic downturns as the sector has expanded rapidly and coverage has spread across all consumer markets. However, with the mobile market more mature now than in previous downturns, it is likely that growth over the next five years will be slower than over the previous five years. In addition, the popularity of the pre-paid mobile segment will provide customers with great flexibility to adjust consumption for those who wish to reign in discretionary spend.

The picture for turnover in the broadband sector is very similar to that of mobile, although growth is likely to be higher, at a compound annual rate of 9.4 per cent from 2008-2013. There are two key trends affecting the prospects for broadband. First, the market is less mature, the latest data for 2007 shows that only 54 per cent of EU households have an internet connection⁸, and, of these around 15 per cent are still using a non-broadband dial up connection⁹. The potential for growth in market coverage will counteract the pressure on household finances and falling levels of average revenue per user. The second important factor affecting the broadband market is the growth of mobile broadband; this represents a serious challenge to traditional fixed broadband market share in the medium term. We believe that there will be sufficient growth in the market for both of these to perform well, and that network capacity issues and limited geographical coverage will act as a significant constraint to mobile broadband over the forecast period.

⁸ Source Eurostat

⁹ *ibid*

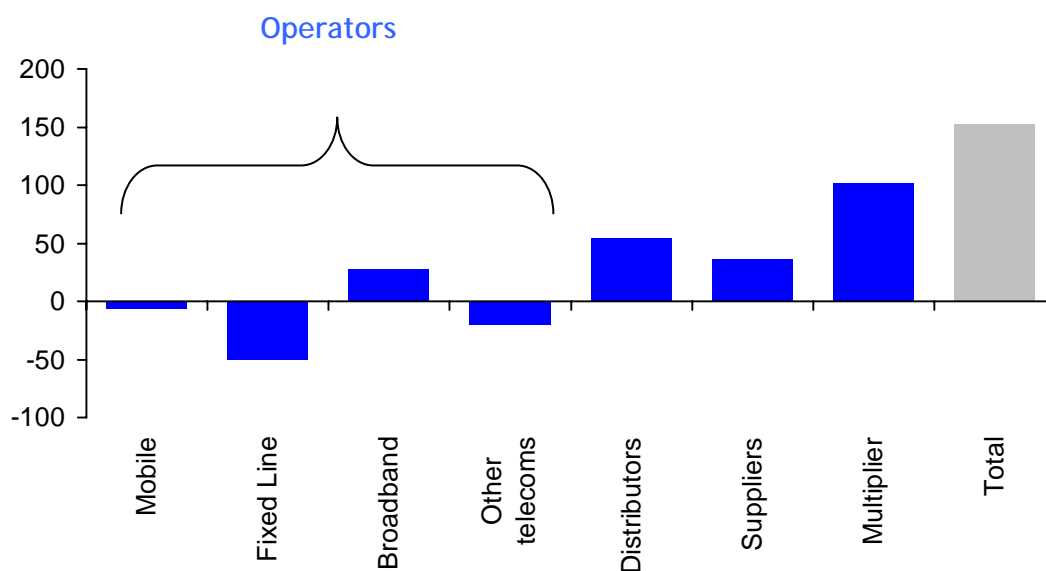
The fixed line sector however, is expected to experience a falling economic contribution over the forecast period at a compound annual rate of -1.0 per cent. The key drivers of this trend are saturation in the fixed line market, continued substitution from fixed line to mobile and falling average revenue per user. The second factor is compounded by the increasing deregulation of the fixed line sector, which increases the competitive pressures faced by incumbents, and will generally reduce profit margins. Other telecommunication services are also likely to perform robustly over the next five years, with growth supported by the growing number of applications for satellite transmission.

Employment

Overall the number of people employed in the EU as a result of the telecommunications sector is set to rise by 150,000 over the next five years as shown in figure 7. This will take the overall number of people employed in the sector from 3.56 million to 3.71 million.

This overall net increase is not likely to be split evenly across the different components of telecommunications. We expect a decline of 50,000 jobs in the fixed line sector and a small decline of 7,000 in mobile operators as improving productivity allows economic output to rise despite a fall in head count. Other telecommunication services including satellite, radio and television transmission are also likely to see a net fall in headcount of 20,000.

Figure 7. Net change in employment in EU telecommunications by sub-sector, 2007-2013, thousands



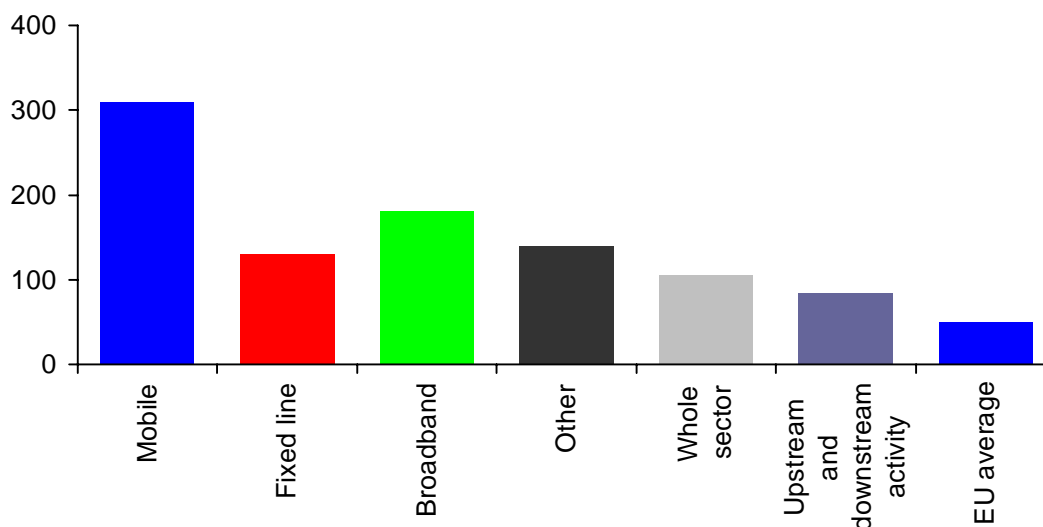
Source: Eurostat, cebr

The areas in which we expect to see employment rise are amongst distributors (54,000) and suppliers (36,000). In addition the growth in the sector as a whole will generate a larger multiplier effect, resulting in a net addition of 102,000 jobs to the wider EU economy.

Productivity

The telecommunications sector is significantly more productive than the average sector in the EU. As shown in figure 8, a typical worker in telecommunications produced €105,000 of value add in 2007; the EU average was €50,000. The mobile sub-sector is the most productive within the telecommunications sector, with €309,000 of value added per employee in 2007, more than six times the EU average.

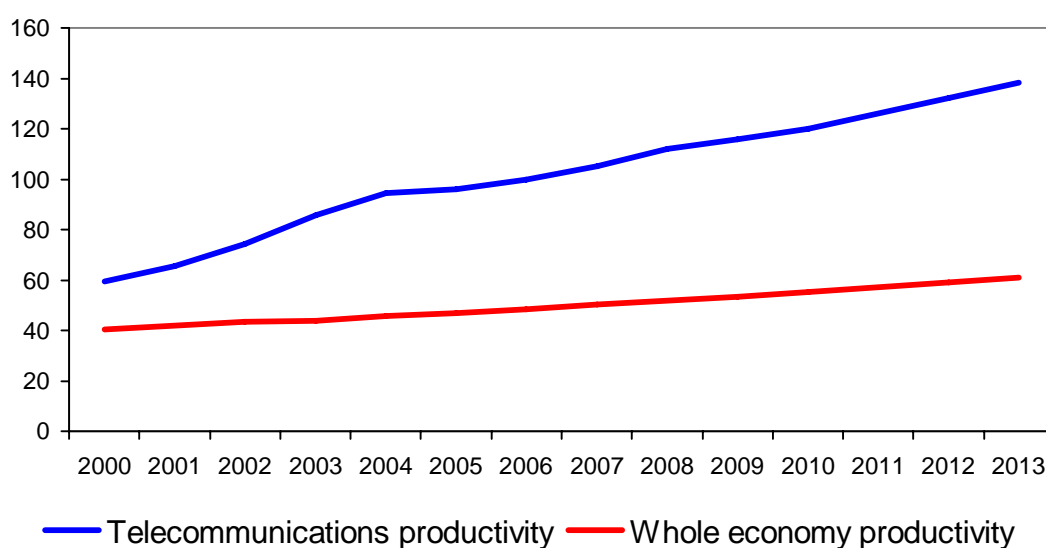
Figure 8. Productivity in EU telecommunications by sub-sector, 2007, thousand euro per employee



Source: Eurostat, cebr

Figure 9 tracks the progression of productivity levels since 2000 and shows how we expect it to develop up to 2013. In 2000, there was a relatively small gap between productivity in telecommunications and the whole economy. A telecommunications worker contributed €59,000 to the economy in 2000, just €19,000 more than the average worker, who contributed €40,000. By 2007 the gap had risen to €55,000, with telecommunication productivity rising to €105,000 per worker and whole economy average productivity rising more modestly to €50,000. This gap was driven by strong growth in turnover and output of the telecommunications sector, which was achieved with little growth in numbers employed.

Figure 9. Productivity in the EU telecommunications sector and economy as whole, thousands of euro per employee



Source: cebr

By 2013 we forecast that the productivity gap will have widened to €77,000. By then the average worker in the EU will contribute €61,000 to the economy compared to the average telecommunications worker at €138,000.

Public finances

The final impact of telecommunications that we quantify in this research is its contribution to public finances of EU member states. Table 3 contains our estimates for the level of taxation paid across the EU, split between major taxes.

Table 3. Tax receipts resulting from EU telecommunications sector

Category	Billions of euro 2007	Billions of euro 2013
Income taxes	€86	€97
Social security contributions	€27	€28
Value added tax	€57	€74
Corporation tax	€18	€24
Total	€187	€223

Source: cebr, excludes tax revenue resulting from multiplier effects, figures may not sum due to rounding

The largest contribution to public coffers comes from income taxation which raised €86 billion in 2007, with the telecommunications sector supporting over 3 million jobs. Value Added tax receipts paid in the downstream retail segment and through direct sales by telecommunications operators to consumers raised €57 billion in tax. Smaller contributions to the public finances also came from corporation tax (€18 billion) and social security contributions (€27 billion).

The growth of the sector over the next five years and in particular the growth in turnover and profits will boost taxes paid by the sector. We expect contributions from these four major taxes to rise to €223 billion by 2013, with significant increases in income taxes and value added tax.

We do not include these figures when computing the overall GDP impact of the telecommunications sector in order to avoid double counting. These calculations are based upon the activities of operators, suppliers and distributors of telecommunications; it does not include multiplier benefits.